

Frederick L. Wellman

1936



FLORA

OF

SYRIA, PALESTINE, AND SINAI,

FROM THE

Taurus to Ras Muhammad,

AND FROM THE

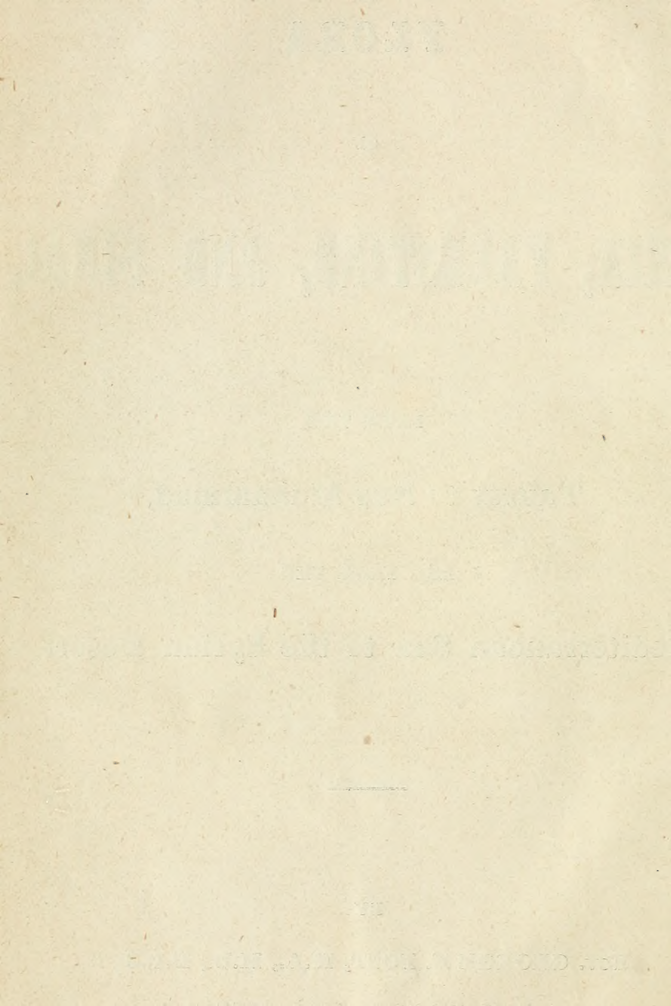
Mediterranean Sea to the Syrian Desert.

BY

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ADDENDA.

The following plants have mostly been discovered since the printing of the Flora was commenced in 1883. Among them, however, are a few which were overlooked when the text was prepared.

It is recommended that references to these Addenda be made in the margin, in their places in the Flora.

PAGE 40. After *R. chionophilus.* **R. sericeus,** Peyron. ♃ .03 to .05, tufted, silky; neck thickened; roots fibrous. Root-leaves oblong, 2-3-pinnatipartite into oblong lobes. Scapes not longer than leaves, 1-flowered; sepals sparingly pubescent, more than half as long as obovate-cuneate petals; carpels round, thick-margined, ending in a short, *straight*, beak; disk finely granular — June to August — 'Ain-Judai (Lebanon).

PAGE 41. After *R. Cassius.* **R. Schweinfurthii**, Boiss. ♃ .2 to .25, appressed-hirsute, yellowish-canescent; root-stock horizontal. Root-leaves trisect into cuneate-oblong segments, sparingly dentate at tip; stem-leaves petioled, pinnatisect into linear-oblong, sometimes incised lobes, the uppermost leaves with 2-3, linear lobes. Flowers .02 broad, long-peduncled; sepals villous, spreading-deflexed, petals obovate, twice and a half as long as calyx; fruiting head globular, axis glabrous; carpels semi-ovate, ending in a slender, recurved, crosier-like beak, as long as they — May — Wet meadows; Neb'-el-'Asal; Jebel Kenîseh; top of Jebel Barûk.

PAGE 41. After *R. Chius.* **R. Pauli-Jordani,** Asch. ⊙ .25 to .3, glabrous or sparingly pubescent; stem branched. Lower leaves cuneate-obovate in outline, palmately 2-3-lobed or -divided, divisions cuneate, with 3, oblong, obtuse, entire or 1-2-dentate lobules. Peduncles slender, usually longer than leaves. Flowers .005 to .006 broad, petals longer than sepals; heads globular, .005 broad; carpels round-obovate, disk *studded* with *unarmed* tubercles; beak one-third as long as ovary, slightly curved or straight — Spring — Wadi Drâ'a (Moab).

PAGE 43. After *Var. incurvus.* Var. **scandicinus,** Boiss. All the leaves dissected into narrow, linear lobes — Southern Palestine.

PAGE 44. After *N. ciliaris.* Var. **divaricata,** Post. Carpels united for one-third their length, divaricate — Phœnician coast.

PAGE 45. After *D. Orientale.* **D. glandulosum**, Boiss. et Huet. ⊙ .4, branched, *glandular-pubescent* at petioles and inflorescence with *golden hairs.* Racemes loose; middle lobe of purple petal linear, bifid, somewhat shorter than lateral lobes; spur twice as long as petal; capsule much shorter than peduncle, oblong, somewhat flattened and incurved, long-beaked — Early summer — Aintâb.

After *D. tomentosum*, Var. **longecalcaratum,** Post. Spur twice as long as purple petal — Aintâb.

PAGE 46. After *D. Cappadocicum.* **D. flavum,** D. C. ⊙ .4 to .5, *hirsute-viscidulous,* branching from base and above, branches rigid. Floral leaves short, undivided. Flowers .008 long, *yellow,* loosely racemed; petal 3-toothed at tip, the lateral teeth longer, half-ovate, the middle tooth short, broad, denticulate; spur as long as petal, curved upward; capsule oblong, .01 to .015 long, tapering at base, *abruptly cuspidate* — July — Palmyrene Desert.

PAGE 47. After *D. Bovei.* **D. Amani,** Post. (Bull. Herb. Boiss. III, p. 152). ♃ .6 to 1; root of 1-2, oblong tubers; stem glabrous, terete. Leaves glabrous except at ciliate margins and sparingly hairy nerves, the lower .2 to .3 broad, palmately parted into overlapping, obovate-oblong, cuneate, obtusely incised, lobed and toothed segments. Raceme .1 to .3 long, rather dense; floral leaves linear, acute, the lower longer, the upper shorter than blue, .025 long, flowers; peduncles recurved, club-shaped, two-bracted at or below middle, bearded with yellow hairs; spur once and a half as long as sepals, straight; ovaries glabrous — August and September — Subalpine Amanus.

PAGE 47. After *D. Ithaburense.*

* * * * *Follicles* 3-5. *Petals separate, entire, the upper falcate, short-spurred, the lower clawed.*

D. Staphysagria. L. ⊙ Stavesacre. .5, soft-hirsute. Raceme elongated, often branched at base. Leaves palmately parted into 5-7, lenticular, acute, entire or trifid lobes; peduncles twice as long as flower, 2-bracted; spur obtuse, one-fifth as long as sepals; limb of lower petals obovate-lanceolate; capsule inflated, hirsute — June — Rashein (Lebanon).

PAGE 47. Before **BERBERIDACEÆ.**

MENISPERMACEÆ, D. C. (MOON-SEED FAMILY).

Woody climbers with oblong, obtuse leaves, no stipules, hypogynous, diœcious or polygamous flowers, (ours) 6-androus and 3-gynous, sepals and petals six, in two rows, imbricated in the bud; fruit a 1-seeded drupe, (ours) with scanty albumen, and an incurved embryo — Carpels free, inserted on the receptacle, style 1. Ovules solitary in carpels, amphitropous, attached to ventral suture.

COCCULUS, D. C. COCCULUS.

Upper sepals larger. Petals shorter than sepals. Anthers 4-lobed. Styles erect or recurved, undivided. Drupe compressed, the scar of the style near the base; stone tubercled at back, deeply excavated at sides; seed horseshoe-shaped; cotyledons linear, flat.



(a) Piece of pistillate plant of Menispermum Leæba. (b) Piece of of staminate plant of same.

C. Leæba, Del. ♄ Glaucous, puberulent; branches slender, elongated somewhat twining. Leaves oblong, subsessile. Cymes few-flowered, short-peduncled, axillary — Summer — Sinai.

PAGE 64. After *N. sylvestre.* **N. aureum,** Boiss. et Held. ♃ Root creeping; stems erect, branching. Leaves not auricled at base, the lower 2-1-pinnatisect into linear-lanceolate, entire or sparingly dentate segments. Fruiting racemes .2 to .25 long, straight; silicles oblong-linear, .005 long, about half as long as pedicel and twice to thrice as long as apiculate style; valves 1-nerved — Summer — Near Elmalu (Northern Syria).

PAGE 66. After *C. uliginosa.* **C. Græca,** L. ⊙ .1 to .15, glabrous or sparingly ciliate. Leaves pinnate, leaflets petiolulate, obovate, obtusely lobed or parted, the terminal lobe cuneate. Pods .03 long, .003 broad, ending in a style as long as their diameter — May — Shady places, Feitrûn (Lebanon); Mt. Cassius.

PAGE 68. After *H. matronalis.* **H. Aintabica**, Post. (Trans. Linn. Soc. Bot., Vol. XXIV, p. 424). ♃ .3 to .4, sparingly hairy; stems nearly simple. Lower leaves obtuse, *lyrate-pinnatifid* or *sinuate-dentate*, upper entire, acute. Petals deep violet; (immature) pods stiff, glabrous — Spring — Aintâb.

PAGE 69. After *M. torulosa.* **M. Bungei,** Boiss. ⊙ Stem .4 to .6, branching from base and above, beset with simple hairs. Leaves beset with bipartite hairs, oblong-linear, sinuate-dentate. Racemes .2 to .3 long, loose; pedicel a little shorter than calyx; petals oblong-linear, pink; siliques straight or circinnate, glabrous; stigma short-conical, acutish — April —

Var. **glabrescens,** Boiss. Stem glabrous. Leaves scabrous only at margins — Fields west of Palmyra.

PAGE 72. *S. Læselii*, L., should be **S. grandiflorum**, Post. (Plantæ Postianæ, I, 3).

PAGE 75. After *E. goniocaulon.* **E. Libanoticum**, Post. (Plantæ Postianæ, III, 5), ♃ .1 to .13, canescent; stems numerous, ascending, stiff. Leaves linear, entire. Flowers * *; siliques few, with short pedicel narrower than pod, ascending, stiff; style slender, twice to thrice as long as diameter of pod, stigmas retuse — June — Between el-Qal'at and Rijâl-el-'Asherah, northern Lebanon (2800 m.).

PAGE 75. After *E. purpureum.* **E. Blancheanum**, Boiss. .3 to .4, greyish-canescent. Leaves linear-subspathulate to linear, *entire*, the lower tapering to a petiole. Flowers pinkish-purple, .01 to .012 long, short-pedicelled; pods .01 to .03 long, .0015 thick, *more or less falcate-recurved;* style .003 long, tapering — July — Palmyrene Desert.

PAGE 77. After *var. foliosa*, Post. Var. **acutelobata**, Post. Root-leaves runcinate-lyrate; stem-leaves acutely triangular-lobed or serrate — Es-Salt to 'Ammân.

PAGE 83. *A. argenteum*, Wittm., should be **A. murale**, W. K.

PAGE 83. After *A. eriophyllum.* **A. Cilicicum**, Boiss. et Bal. ② .3 to .4, green, sparingly beset with minute scurf; stem corymbose-panicled. Leaves oblong-spathulate. Petals obovate, deep yellow; fruiting racemes short; silicles on capillary, wavy pedicels, stellate-hirtulous, .002 broad, orbicular, twice as long as apiculate style; seeds wingless — June and July — Kurd Dagh; mountains west of Marash.

PAGE 85. After *A. macrostylum.* **A. minutum,** Schlecht. ⊙ .05 to .1, hirtulous with stellate hair, branching from base. Leaves minute, obovate to oblong, obtuse. Petals pale yellow, linear, retuse; fruiting racemes somewhat elongated; silicle orbicular, .003 broad, retuse, four times as long as apiculate style; seed with narrow membranous margin — April.

Var. **condensatum,** Post. Fruiting raceme short, forming an almost globular head — Hassan Belyley Pass (Amanus).

PAGE 86. After *A. Damascenum.* **A. dasycarpum,** Steph. ⊙ .1, branching from base. Leaves entire, obovate, obtuse or acutish. Racemes dense; sepals at length deciduous; petals nearly linear; silicles elliptical to orbicular, convex, about as long as style; seeds wingless — Spring — Tiberias; Palmyrene Desert.

PAGE 86. Before *A. aureum.* **A. homolocarpum,** F. and M. ⊙ .05 to. 13, grey, branching from base. Leaves lanceolate. Flowers minute; petals spathulate-cuneate, yellow, shorter than calyx; fruiting raceme .03 long; silicles longer than spreading pedicel, orbicular, .004 broad, scarcely inflated, five times as long as filiform style; seeds with narrow margin — Spring — Sinai.

PAGE 87. Before *C. sativa.* **C. sylvestris,** Wallr. ⊙ .3 to .5, appressed-strigulose. Leaves entire or denticulate. Fruiting racemes .2 to .3 long, loose; pedicels spreading, twice to thrice as long as pyriform, .006 long, punctate, margined silicle; style half as long as pod — Spring — Fields; middle zone of Lebanon and Antilebanon to Aintâb, and northward.

PAGE 88. After *C. Bursa-Pastoris.* Var. **minuta**, Post. Pods .0025 long. Leaves linear — Mukhtarah (Lebanon).

PAGE 94. Before *C. oxyceras.* **C. Amani**, Post (Plantæ Postianæ, v, 2). ② .1, green; stems 2-3 from neck. Lower leaves repand, petioled, obovate-oblong; cauline oblong, obtusely auricled, clasping. Raceme .03 long in fruit; flowers * * *, silicles obtriangular-obcordate, with moderately diverging horns, and style as long as sinus — July — Moist woods; Amanus.

PAGE 95. After **IBERIS**.

* *Leaves entire or nearly so. Flowers radiating. Perennials.*

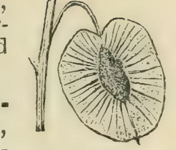
1. I. sempervirens, ♄ .2 to .3; branches ascending, naked below, leafy above. Leaves oblong-linear, obtuse, glabrous. Flowers white; silicles in a short raceme, ovate, with acute sinus and lobes; style longer than sinus — May and June — Aintâb ?

PAGE 97. Before **ISATIS**.

SAMERARIA, Desv. SAMERARIA.

Calyx equal at base. Petals oblong-spathulate, clawed. Stamens free, toothless. Silicle indehiscent, coriaceous or chartaceous, not fungous, cordate at base, surrounded by a broad, membranous wing, the cell coriaceous or membranous, keeled at back on either side or furnished with wings shorter and narrower than cell. Style filiform. Seed 1, pendulous. Cotyledons incumbent — Annual, glaucous herbs, with entire, oblong, cordate-clasping stem-leaves, bractless racemes, deflexed fruiting pedicels, and pale yellow flowers.

S. Armena, L. ⊙ Silicle orbicular, hirtulous, with a closed sinus at tip; style as long as sinus; marginal wing more or less plicate — Spring — Overflowed ground. Near el-Weshen (Palmyrene Desert).



Silicle of Samerara Armena.

PAGE 108. After *C. brachycarpa.* **C. glaucescens,** D. C. ♃ .3, glabrous below; stems angled, simple or sparingly branched. Leaves petioled, round-ovate, obsoletely 3-nerved at base, the lower .02 to .03 long. Racemes terminal, glandular; bracts sessile, oblong; pedicels thrice as long as bracts; petals oblong, obtuse, netted-veined, 3-4 times as long as calyx; pods *broad-linear*, acute, falcate, sparingly papillose — Spring — Palmyra.

PAGE 112. After *R. Kahirina*, Mull. ⊙ .3 or more, glabrous. Lower and middle leaves lanceolate-spathulate, entire, upper ternate. Racemes loose; pedicels longer than flower; sepals linear-oblong, about as long as white corolla; lateral lobes of upper petals half-ovate, deeply incised; capsule obovate, glabrous, short-3-toothed with somewhat constricted mouth — Spring — Jebel Uṣdum to 'Ain-Jidi.

PAGE 124. In place of Var. *pruinosus.* **D. deserti,** Post. (Plantæ Postianæ, II, 6). ♃ .3, pruinose-velvety; stems numerous, simple or stiff-branched. Leaves connate at base, appressed to stem, scabridulous at margin, scarcely longer than internodes. Flowers solitary or 2-3 in a cluster; scales scarious, ovate, cuspidate; calyx about twice as long as scales, teeth oblong-ovate, the nerves of the sinuses long-decurrent; lamina pink, obovate-cuneate, dentate — April to July — Mountains south of Qaryetein.

PAGE 125. After *D. floribundus.* **D. Haussknechtii**, Boiss. ♃ .15 to .2, tufted, many-stemmed. Leaves rigid, linear, scabrous at margin; sheaths of stem-leaves longer than diameter of stem, with short limb. Stems 1-2-flowered; scales short-ovate, hyaline at margin, acute, mucronate, one-third as long as calyx; calyx-teeth triangular, acute, white-margined; lamina obovate, dentate, white at upper, greenish or brownish at lower surface — July — Top of Jebel Barûk; Ṣudr-esh-Sheikh-'Ali (Antilebanon).

PAGE 127. After *T. Syriaca.* **T. filiformis,** Post. (Plantæ Postianæ, v, 3.) ⊙ .5, glabrous; stem reddish, minutely white-dotted, stiff-panicled from base. Leaves linear, 3-5-nerved, scabridulous at margin, the upper subulate. Pedicels filiform, 1-3 times as long as calyx; calyx-teeth short-triangular, mucronate; lamina white, oblong, entire; capsule about twice as long as calyx — July — Amanus.

PAGE 129. After *G. Aucheri.* **G. hygrophila,** Post. (Plantæ Postianæ, II, 6.) ♃ .1, crisp-puberulent below, glabrescent-glaucous above; stems elongated, pendulous, forked-branched. Leaves fleshy, rounded at base, oblong, .15 to .18 long, .02 to .03 broad, obtuse, 5-nerved, scabridulous at margin. Bracts scarious, triangular; pedicels capillary, 2½-3 times as long as turbinate-campanulate calyx; calyx-lobes ovate, broad-margined; claw included; lamina pink, oblong, .003 to .005 long, twice as long as calyx — July — Ditches; Mar Liân (Qaryetein).

PAGE 129. After *G. ortegiodes.* **G. tubulosa**, Nob. ⊙ .1 to .2, *glandular-hirtulous;* stem and branches filiform, forked. Leaves

linear-setaceous, .005 to .015 long, acutish. Pedicels much longer than calyx; calyx tubular-campanulate, .003 to .005 long, membranous between nerves, teeth ovate, obtuse; petals purple, cuneate, retuse, as long as calyx; capsule oblong-cylindrical, as long as calyx; seeds transversely wrinkled — May — Kefr Hûneh to Jezzîn (Lebanon).

PAGE 130. After *G. porrigens.* **G. Antilibanotica,** Post. (Plantæ Postianæ, II, 6.) ♄ .08 to .2; branches minutely puberulent, erinacous. Leaves .003 to .015 long, .001 to .0015 broad, minutely and sparingly puberulent-scabridulous, terete, *prickly mucronate. Heads dense,* terminal, *easily broken off;* bracts longer than calyx, dilated at base, linear-lanceolate, prickly; calyx cleft for one-fourth its length into ovate, prickly-mucronate teeth; lamina white, spathulate, entire, slightly exserted — July — Top of mountain above Bludân.

PAGE 137. After *S. crassipes.* **S. papillosa,** Boiss. ⊙ .3 to .4, hirtulous; stems forked-branched. Leaves oblong-lanceolate to linear-lanceolate, the floral longer than flowers. Flowers subsessile, alar and terminal; calyx *setose* at green nerves with *long, wavy, soft papillæ,* cylindrical and in fruit oblong-club-shaped, teeth lanceolate, acute; lamina pink, cuneate, 2-lobed; capsule twice as long as carpophore — Spring — Beirût; Beit-Meri.

PAGE 140. After *S. Kotschyi.* Var. **effusissima,** Boiss. Stems much-branched. Alar peduncles sometimes .02 to .05 long. Lobes of crown triangular — Marash.

PAGE 141. After *S. Cassia.* **S. intricata,** Post. (Bull. Herb. Boiss., III, 154.) ♃ ? .6 to 1, papillose-roughened below, glabrous-viscid at inflorescence; stems numerous, intricately panicled, branches filiform. Leaves grass-like, .02 to .05 long, the uppermost very narrow. Peduncles much shorter than calyx; calyx .015 long, glabrous, red-lined, teeth ovate, obtuse; lamina greenish, cuneate, bipartite to beyond middle, half as long as calyx; lobes of crown tooth-like; capsule oblong, as long as carpophore — August and September — Gaiour Dagh (Amanus).

PAGE 145. After Var. *stenophylla.* Var. **brevipes,** Post. Peduncles short — Wadi-el-Qarn (Antilebanon).

PAGE 146. After *S. Schlumbergeri.* **S. infidelium,** Post. (Bull. Herb. Boiss., III, 154.) ♃ .16 to .3, glabrous, many-stemmed from base; stems stiff, geniculate, 1-2-flowered. Leaves linear-spathulate to linear-long-acuminate, the lower .04 long, .002 to .005 broad. Calyx pale green or red-striped, cylindrical, then club-shaped, .025 long, teeth triangular, scarious-margined; claws dilated, glabrous; lamina pale, linear-cuneate, bifid to beyond its middle; capsule ovate, about as long as carpophore — August and September — Gaiour Dagh (Amanus), 1500 m.

PAGE 148. After *A. setacea.* Var. **puberulenta,** Post. The whole plant puberulent — Gaiour Dagh (Amanus), 1500 m.

PAGE 153. After *A. Libanotica.* **A. Adonidis,** Peyron. ♃ .1 to .15, tufted, glabrous; stems filiform. Leaves .003 long, linear, obtuse. Stems few-flowered; pedicels twice to thrice as long as calyx; sepals oblong, acute; petals obovate, twice as long as calyx — June — Neb'-el-Ḥadîd; Afqa.

PAGE 155. Before **CERASTIUM**.

MŒNCHIA, Ehr. MŒNCHIA.

Sepals 4-5. Petals 4-5, entire or retuse. Stamens 4-8-10. Styles 4-5. Ovary ∞-ovuled. Capsule 8-10-dentate, teeth revolute at margin. Seeds reniform — Annual, glaucous herbs differing from Cerastium in habit, short capsule, and nearly entire petals.

M. octandra, J. Gay. ⊙ .15 to .3; stem 1-2-5-flowered. Leaves lanceolate-linear, acuminate. Pedicels filiform, much longer than calyx; bracts herbaceous, narrowly scarious; flowers 4-merous; sepals lanceolate, acute, scarious-margined, longer than white petals; capsule oblong, little shorter than calyx — Spring — Beirût, near the river; border of Pines.

PAGE 155. After *C. Kotschyi.* **C. trigynum,** Vill. ♃ .05 to .1, tufted; trunks procumbent, rooting; stems glabrous or puberulent. Leaves glabrous, oblong-lanceolate, acutish. Cyme 1-∞-flowered; pedicels long, glandular-pubescent, in fruit reflexed; sepals oblong, obtuse, scarious-margined; petals obcordate, about twice as long as calyx; capsule twice as long as calyx, teeth at length spreading — Summer — Top of Jebel Makmel.

PAGE 159. After *P. tetraphyllum.* **P. alsinefolium**, Biv. ⊙ .02 to .15, branching from base, procumbent. Leaves somewhat fleshy, in fours or twos, opposite. Cymes dense, flowers 5-androus; pedicels about as long as calyx; sepals ovate, mucronate; petals oblong, nearly entire, half as long as calyx; *style shorter than ovary* — Spring — Sands; Phœnician coast.

PAGE 160. After *H. hirsuta.* **H. densiflora,** Williams. MS. ⊙ .1 to .15, strigose-pubescent, greyish-canescent. Leaves ovate to ovate-lanceolate, tapering at base, obtuse; stipules triangular. Flowers sessile, in clusters of 3-12, shorter than the leaf; calyx-lobes with a thickened, narrowly hyaline margin, acutish, the outer two ovate, the inner elliptical — Spring — Lebanon.

PAGE 162. After *P. argentea*, var. *scariosissima.* **P. echinata,** Desf. ⊙ .05 to .1, pubescent; branches ascending from neck. Leaves ovate-oblong, acute, scabrous, denticulate. Clusters dense, in the axils; bracts lanceolate, acuminate, shorter than flowers; calyx urn-shaped, lobes spathulate, truncate, aristate — May — Sands; coast to Beit-Meri and Bikfayah.

PAGE 170. Before *H. hircinum.* **H. Androsæmum,** L. ♄ .5 or more, glabrous; stems erect. Leaves coriaceous, ovate from a sessile, cordate base, .03 to .07 long, obtuse. Cyme corymbose, sheathed at base by upper leaves; sepals ovate, obtuse, persistent; capsule larger than a marrowfat pea, berry-like — Summer — Rocky places; Kurd Dagh and Amanus.

PAGE 171. After *H. hircinum.* **H. Olympicum**, L. ♃ .5, glabrous, glaucous; stems decumbent or ascending from a hardened root-stock. Leaves sessile, *lenticular*, .01 to .02 long, prominently pellucid-dotted. Cyme terminal, 1-5-flowered; calyx less than half as long as corolla, growing in fruit, lobes *not black-dotted*, the outer ovate, cuspidate, the others ovate-oblong, acute; flowers .04 broad — Summer — Gaiour Dagh (Amanus).

Page 172. After *H. confertum.* Var. **stenobotrys**, Boiss. Asperulous, glabrescent above. Calyx-lobes oblong-lanceolate, obtusish, short-fringed — 'Ain-Judai (Lebanon).

Page 172. After *H. hyssopifolium*, var. *latifolium.* Var. **microcalycinum,** Boiss. Leaves narrow; sterile twigs imbricated; sepals ovate, obtuse, densely glandular — Amanus; Kurd Dagh.

After *H. helianthemoides.* Var. **nanum**, Keller et Post. .15 to .2. Leaves minute, scabridulous and glabrescent, glandular — Gaiour Dagh (Amanus).

Page 177. After *A. lavateræflora*, var. *pallida.* Var. **glabrescens**, Boiss. Stems glabrous. Leaves nearly glabrous. Involucre half as long as calyx or less — Palestine.

Page 177. After *A. apterocarpa.* **8. A. Kurdica**, Schlecht. ♃ 1 or more, hirtulous-tomentellous. Raceme loose, often paniculate. Lower leaves cordate-reniform, 5-7-lobed, the floral smaller, more or less deeply palmatipartited into linear-oblong, acutely crenate lobes. Peduncles shorter than calyx; involucre a third as long as calyx, lobes triangular; calyx-lobes lanceolate; petals violet; seed white pustular, somewhat grooved at back — Summer — Rocks; Antilebanon above Zebedâni.

Page 180. After **TILIACEÆ**, before **GREWIA.**

TILIA, L. Linden.

Sepals 5, deciduous. Petals 5, naked, or with petaloid scales at inner aspect of base. Stamens numerous, free or irregularly polyadelphous at base. Ovary 5-celled, with 2 ovules in each cell. Style simple, stigma 5-dentate. Fruit globular, indehiscent, by abortion 1-celled, 1-2-seeded — Trees with axillary or terminal cymes, the peduncle united as far as middle with a leaf-like bract.

T. argentea, Desf. ♄ .6 to .8; comus ovate. Buds pubescent; leaves with cordate, oblique base, ovate, acuminate, acutely dentate, white with fine stellate wool at lower surface. Capsule as large as a marrowfat pea, obovoid-globular, apiculate, ribs scarcely prominent — Summer — Amanus.

Page 183. After *L. nodiflorum.* **L. toxicum**, Boiss. ♄ .15 to .2, glabrous, glaucescent; branches stiff, simple, forming an intricate bush. Leaves thick, oblong, .005 to .014 long, the lower obtuse, the upper acute. Flowers terminal, solitary or 2-3 in a head; sepals oblong, with scarious, glandular-denticulate margin, mucronate, about one-third as long as yellow, acutish petals; capsule globular-ovate, a little longer than sepals — June and July — Top of Mt. Hermon. Poisonous to goats.

Page 184. In place of 14. *L. Austriacum.* **L. Peyroni,** Post. (Plantæ Postianæ, iii, 6.) ⊙ .3 to .4, glabrous; stems branching from base or above, loosely corymbose. Leaves rather crowded, linear, acute, .005 to .012 long. Flowers few, solitary, pedicels erect in flower, nodding in fruit; sepals ovate or nearly orbicular, obtuse, mucronulate, narrowly scarious-margined, *one-third as long* as pale petals and capsule; capsule globular, .01 in diameter, more than twice as long as sepals — April and May — Fields; Ḥaurân to Cœlesyria, Antilebanon, and Aintâb.

PAGE 191. After *G. asphodeloides.* **G. Pyrenaicum,** L. ♃ .5, soft-pubescent, glandular above; stems ascending. Leaves reniform, 7-9-cleft into obtuse, crenate-dentate lobes, the upper small, palmatiparted. Peduncles axillary, pedicels reflexed in fruit; sepals oblong, short-mucronate; petals purple, obcordate, ciliate above base, about twice as long as calyx; valves appressed-pubescent or glabrescent — Summer — Afqa (Lebanon).

PAGE 200. After **MELIACEÆ.**

ORDER **AQUIFOLIACEÆ,** D. C. (HOLLY FAMILY).

Trees or shrubs, with small, axillary, 4-8-*merous flowers, a minute calyx, free from the* 4-8-*celled ovary and resulting* 4-8-*seeded berry-like drupe; the stamens as many as the petals, alternate with them, inserted at their base* — Calyx imbricated in æstivation. Cells of ovary 1-2-ovuled. Albumen copious, embryo straight, small.

ILEX, L. HOLLY.

Calyx persistent, 4-5-toothed. Corolla rotate, 4-5-parted. Ovary sessile, nearly globular, 4-5-celled, stigmas 4-5, nearly sessile. Drupe globular, pyrenes 4-5, crustaceous — Shrubs, with leathery, glossy, alternate leaves.

I. Aquifolium, L. ♄ ♄ 2 to 3 or more. Leaves ovate, acute, wavy, spiny-dentate or entire. Peduncles axillary, short, many-flowered, flowers somewhat umbelled; drupe dark crimson, as large as a marrow-fat pea — May — Gaiour Gagh (Amanus).

PAGE 202. After *R. Libanotica.* **R. glaberrima,** Peyron. ♄ 2 to 4, unarmed, glabrous. Leaves petioled, oblong to lenticular, .03 to .05 long, entire. Umbel long-peduncled; drupe black, as large as a currant, half as long as pedicel — May — Forest of Ehedin.

PAGE 222. After *T. Cassia.* **T. Amana,** Post. .1 or more, soft-pubescent. Leaflets obovate to cuneate-truncate, denticulate at tip. Flowers 2-4 in axillary and terminal clusters, *pale yellow*; calyx-teeth one-fifth as long as hirsute tube, narrow-triangular, acute; corolla once and a half as long as calyx, immature pods sparingly hairy — April — Hassan Beyley to 'Othmanîyeh; Beilân to Kurk-khan.

PAGE 222. After *T. astroites.* **T. aurantiaca,** Boiss. ⊙ .1 to .15, appressed-pubescent, procumbent. Stipules short-triangular; leaflets obovate-cuneate, small, denticulate at tip. Peduncles filiform, twice to thrice as long as leaves; flowers 8-12 in a head, *orange-colored;* calyx half to one-third as long as corolla, teeth setaceous, longer than tube; pods appressed-pubescent, curved, .02 long, .001 thick, transversely reticulate-nerved — June — Kurd Dagh.

PAGE 222. After *T. Noeana.* **T. orthoceras,** Kar. et Kir. ⊙ Appressed-hirsute, erect. Stipules semi-sagittate, dentate; leaflets obovate, dentate at tip. Peduncle nearly 0; flowers 2-4, .005 long, sessile; calyx a little shorter than corolla, teeth subulate, longer than tube; pods appressed-puberulent, .012 long, .0015 broad, *straight,* reticulate-veined with the areolæ longer lengthwise — Spring — In a garden near Beirût (Peyron).

PAGE 225. After *T. minima.* **T. lunata,** Boiss. ⊙ .3 to .4, papillose-hairy, procumbent. Stipules semi-ovate, striped, denticulate at tip. Peduncles 1-3-flowered, shorter than leaves, long-awned; calyx-teeth setaceous, somewhat longer than tube, two-thirds as long as corolla; pod nodding, flat, *semilunar*, .018 long, .01 broad, transversely nerved, with an acute, incurved beak — June — Aintâb.

PAGE 226. After *T. Schlumbergeri.* **T. Aschersonii,** Urb. ⊙ .03 to .05, diffuse, prostate. Stipules ovate to ovate-lanceolate, pinnatifid-dentate; leaflets triangular-obcordate, with 2 teeth on each side of sinus and a mucro at its bottom, glabrous at upper, sparingly hairy at lower surface. Inflorescence 1-flowered, peduncle shorter than petiole; flower .004 long; calyx-teeth triangular to triangular-lanceolate, half as long as puberulent tube; corolla twice as long as calyx, yellow; ovary linear, style falcate, stigma capitate — April — Nazareth.

PAGE 229. After *M. denticulata.* **M. sessilis,** Peyron. ⊙ .1 to .15, *pubescent.* Stipules semi-ovate, acute, entire. Flowers *solitary or twin, sessile or nearly so*, minute; pod sparingly pubescent, .003 broad; coils 4, rather compact; margin prominent, deeply grooved on either side, with 2 rows of short prickles at right angles to face of coil — May and June — 'Ain-Ṣofar; Kefr Silwân; Ḥammâna; el-Maṣna'ah (Antilebanon).

PAGE 231. Before *M. parviflora.* **M. Italica,** L. 1 or more; stem stout, erect. Lower stipules *fringed-toothed;* leaflets large, obovate-cuneate. Racemes longer than leaf; flowers .005 long, yellow; pod *obovate-globular*, .003 long, corky — April and May — Near Zûq (Lebanon).

PAGE 234. After *T. lappaceum.* **T. Ligusticum,** Balb. ⊙ Soft-hispid; stems erect or decumbent. Free portion of stipules lanceolate-setaceous; leaflets obovate; heads ovate or oblong, usually two, one peduncled, the other sessile; calyx longer than pink corolla, teeth equal, triangular at base, setaceous at tip, twice as long as tube — Spring — Beit-Meri.

PAGE 242. Before *T. Aintabense.* **T. multistriatum,** Koch. ⊙ Glabrous; stems elongated, ascending or diffuse. Free part of stipules lanceolate, mucronate; leaflets obovate to elliptical-acute, all serrulate; heads ovate, base usually naked; calyx-teeth nearly equal, lanceolate at base, then subulate, erect, at length recurved, somewhat shorter than cylindrical, at length ovate tube, which is 24-nerved at base, and between the nerves smooth or obsoletely transverse-nerved; corolla purple — Spring — Palestine.

PAGE 242. After *T. glomeratum.* **T. suffocatum.** ⊙ Glabrescent; stems short, prostrate, rosetted. Leaves long-petioled, leaflets cuneate-retuse or obcordate, serrulate at tip. Heads sessile, axillary, confluent at the lower part of the stems, and sheathed by cuspidate stipules; flowers nearly sessile; calyx twice as long as white corolla, teeth lanceolate, at length recurved or falcate, as long as the at length ovate tube — April — Nazareth; Jaffa.

PAGE 250. After *Lotus Conimbricensis.*

‡ ‡ *Flowers yellow.*

PAGE 255. Last line but one. In place of *A. Prusianus*. **A.** gossypinus.

PAGE 259. After *A. callichrous*. **A. Moabiticus,** Post. ⊙ .05 to .1, sparingly hairy, diffuse. Leaves .025 long; leaflets 5-8 pairs, elliptical, obtuse, .006 long, .002 broad. Heads a little larger than a marrowfat pea, 4-6-flowered, peduncle as long as leaf or shorter; calyx white-and-black-hairy, teeth linear-setaceous, as long as tube; corolla violet; lamina of vexillum obovate-retuse; pod * * — April — Between Mashatta and Zîza (Moab).

PAGE 261. After *A. bombycinus*. **A. Palmyrensis,** Post (Plantæ Postianæ, I, 6). ⊙ .4 to .5, crisp-white-and-black-villous; stems prostrate. Leaflets 8-10 pairs, obovate, .008 long, retuse, rather remote. Racemes loosely 5-10-flowered, peduncle shorter than leaf; calyx-teeth as long as tube; corolla white, .02 long; pods oblong, incurved, white-fleecy — April — Wells of Abu Fâḍil, west of Palmyra.

PAGE 268. In place of *A. Prusianus*, Boiss. **A. gossypinus,** Fisch. ♄ .2 to .4; branches long, *loosely spiny, woolly canescent.* Spines .02 to .08 long; stipules ovate at base, abruptly cuspidate, at length glabrescent; leaflets 4-8 pairs, ovate to obovate-oblong, .005 to .01 long, long-prickly, woolly-canescent. Axils ∞-flowered, forming ovate or globular, terminal heads, a little smaller than a walnut; bracts oblong, boat-shaped, villous at upper part of back; calyx .007 long, woolly-canescent — Summer — Bashlamîsh, base of Amanus, and eastward.

PAGE 269. In place of Var. *alpinus*, Post. Var. **filagineus,** Boiss. Heads scarcely larger than a filbert, often crowded together at tip of branch. Spines .02 to .03 long, those of heads leafless. Leaflets 3-4 pairs, .003 to .006 long — Top of Akher Dagh.

PAGE 269. Before *A. psilacmos*. **A. exiguus,** Post (Plantæ Postianæ, III, 7). ♃ .04 to .05, heads just emerging from shingle; trunk vertical; branches numerous, ascending, covered with imbricated, dead petioles. Leaves few, .012 to .018 long, forming an involucre to the heads, and mixed with the flowers; spines yellow, short; stipules ovate, acute, scarious; leaflets 1-4 pairs, lenticular, .006 to .01 long, white-silky, prickly-mucronate, much longer than petiolar spine. Axils 4-6-flowered, crowded into cocoony, globular, terminal heads, larger than a filbert; bracts ovate-oblong, acute, shorter than calyx, fleecy; calyx fleecy, split to base, .012 long; corolla shorter than calyx, cream-colored — July — Shingle; top of Ṣudr-esh-Sheikh-'Ali (Antilebanon).

A. Antiochianus, Post. ♃ .2 to .3; branches yellow, loosely leafy, densely tomentellous between stipules, beset with old spines at base. Spines .03 to .05 long; stipules ovate-triangular, cuspidate-tapering, tomentellous toward base, glabrescent toward tip; leaflets 6-8 pairs, oblong, tapering at base and tip, .006 long, .002 broad, spiny-mucronate, longer than petiolar spine, appressed-silky, pale green. Axils 5-6-flowered, crowded into an ovate or globular head, .02 to .05 long, intermixed with leaf-bearing spines; bracts linear, tapering, long-villous at back, nearly as long as calyx; calyx .009 long, villous, teeth longer than tube — August — Near Antioch.

PAGE 270. After *A. Bethlemiticus*. **A. Barbeyanus,** Post (Plantæ Postianæ, V, 5). ♄ .3, erinaceous; branches beset with old, weak, spreading, blackish spines. Stipules lanceolate, glabrous, the

free portion ciliate at margin; spines weak, .02 to .04 long, hairy; leaflets 5-6 pairs, lenticular, spiny-mucronate, appressed-canescent, .006 to .008 long, .003 broad. Axils 2-5-flowered, few together at tips of branches; bracts ovate-orbicular, boat-shaped, short-mucronate, crisp-tomentellous at back; calyx white-hairy, split nearly to base, teeth subulate; vexillum .02 long — July — Amanus.

PAGE 273. After *A. macrocephalus.* **A. Ehrenbergii,** Bge. ♃ .3 or more, glabrous; stem slender. Stipules herbaceous, oblong-lanceolate; leaves .15 long; leaflets 8-12 pairs, oblong-linear to linear, the longest .015 long, .002 broad. Peduncles longer than globular heads; calyx campanulate, stiff-villous, .016 long, teeth longer than tube, as long as vexillum; vexillum recurved, scarcely longer than the wings and keel, orbicular, notched — Summer — Beskinta (Lebanon).

PAGE 274. After *A. Kotschyanus.* **A. Mitchellii,** Post (Plantæ Postianæ, I, 7). ♃ .12 to .15, appressed-canescent, diffuse. Stipules minute, triangular, ciliate, green at tip, connate at base; leaflets 8-13 pairs, oblong-cuneate, obtuse or retuse, .004 to .007 long. Peduncles twice to thrice as long as leaf; heads ovate-globular; bracts triangular, longer than pedicels ; calyx appressed-white-and-black-hairy ; teeth triangular-lanceolate, one-fourth as long as tube; corolla *deep-violet*, .02 long, vexillum obtuse, longer than wings — April — Border of Syrian Desert, between Eṣ-Ṣâiṭ and Abu-Dâli

PAGE 283. After *O. Ptolemaica.* **O. Kurdica,** Post (Plantæ Postianæ, IV, 6). ♃ .15 to .2, appressed-silky, canescent, nearly erect. Stipules scarious, connate beyond middle; leaves .08 to .12 long, of 4-9 pairs; leaflets obovate, .007 long, mucronate or muticous or retuse. Calyx-teeth subulate, twice as long as tube; corolla .008 long, pink, scarcely twice as long as calyx; (young) pod appressed-silky, long-prickly — June — Kurd Dagh.

PAGE 288. After *V. serratifolia.* **V. aurantia,** Stev. ♃ .5 to 1, hirtulous, erect. Leaves .15 to .2 long; leaflets 5-7-pairs, ovate, .03 to .04 long; petiole muticous or mucronate; stipules unequal, one cordate-ovate, the other oblong-lanceolate. Racemes ∞-flowered, as long as leaves or shorter; calyx hirsute, the lower tooth lanceolate, as long as tube, half as long as *orange-colored corolla*, the others very short, triangular; pod long-stipitate, flattened, rhombic — June—Kurd Dagh.

PAGE 290. After *V. gracilis.* **V. pubescens,** D. C. ⊙ .3 to .4, *puberulent*, slender, climbing. Leaflets 3-5 pairs, *ovate to elliptical;* stipules semi-hastate, linear-lanceolate, entire. Peduncles filiform, 1-5-flowered, *muticous, somewhat longer than leaf;* calyx half as long as bluish-white corolla; pod linear, pubescent, .01 to .015 long, .002 to .003 broad, 4-6-seeded — Spring — Beirût; Beit-Merî.

PAGE 295. After *O. hirsutus.* Var. **glabratus,** Boiss. Glabrescent — Amanus.

PAGE 314. Before *U. Libanoticus.* **U. Pestalozzæ,** Boiss. ♃ .1 to .3, *glaucous*, more or less pubescent-glandular. Root-leaves spathulate, obtuse, cuneate at base, obsoletely denticulate, stem-leaves obovate-oblong. Panicle glandular-hirsute, flowers somewhat one-sided ; corolla pale pink, twice and a half as long as calyx, cleft to middle into lanceolate, tapering lobes — Spring — Ṣof Dagh to Akher Dagh, and northward.

PAGE 316. After *S. amplexicaule.*

* * *Annuals or monocarpic. Leaves flat.*

S. Amani, Post (Plantæ Postianæ, v, 6). ⊙ .1 to .2, crisp-puberulent; stems simple or branching from neck, thyrsoid-panicled, pale or reddish. Leaves numerous, flat, spathulate, the lower .013 to .02 long, .002 to .004 broad, obtuse, entire, the upper whorled. Cymes 4-12-flowered; calyx-teeth oblong, acute, cuspidate, tawny; petals .002 long, white, lanceolate, tapering, scarcely longer than calyx; stamens 10-12; carpels puberulent, erect, beaked — July — Amanus.

PAGE 319. Add a semicolon at the end of line 3, under **PUNICA**. The line will then read "with two tiers of cells, the lower consisting of 3, and the upper of 5;"

PAGE 322. After *E. roseum.* **E. origanifolium,** Lam. ♃ .2 to .3; *stolons bearing bulb-like buds at their tips,* covered with imbricated scales. Leaves somewhat petioled, *ovate,* acute, remotely repand-dentate. Flowers few, .008 broad, nodding in the bud — August — Jebel Ṣunnîn.

PAGE 322. Before ORDER XLV. **CUCURBITACEÆ.**

CIRCÆA, L. ENCHANTER'S NIGHTSHADE.

Calyx-tube slightly prolonged beyond ovary, limb 2-lobed, at length circumscissile, caducous. Petals 2, obcordate. Stamens 2, alternating with petals. Fruit pear-shaped, bur-like with hooked bristles, 1-2-celled; cells 1-seeded — Tender herbs, with small, white flowers, in peduncled, terminal and lateral racemes; leaves alternate, petioled.

C. Lutetiana, L. ♃ .3 to .6. Leaves ovate, cordate or rounded at base, repand-denticulate. Bracts 0; pedicels reflexed in fruit; calyx-teeth ovate, acute; petals 2-lobed, short-clawed — Summer — Woods; Amanus.

PAGE 342. After *B. trichopodum.* Var. **depauperatum,** Boiss. Involucels as long as flowers — Among reeds, at mouth of Beirût river.

PAGE 348. After *B. angustifolia.*

REUTERA, Boiss. REUTERA.

Calyx-teeth obsolete. Petals ovate, nearly entire, convolute at tip. Fruit laterally flattened, ovate to oblong. Ribs of mericarp 5, filiform, obsolete. Grooves 2-3-vittate. Inner face of albumen flat — Biennial or perennial herbs, with yellow flowers.

R. tenuis, Boiss. et Haussk. ♃ .1 to .15; stems rigid, filiform, forked-branched. Root-leaves rosetted, petiole once and a half to thrice as long as limb; limb truncate to cordate at base, orbicular, .01 in diameter, acutely 5-10-dentate; stem-leaves at forks reduced to a setaceous sheath. Umbels with 2-3, short, capillary rays; fruit oblong, .002 long, longer than pedicel — Rocks over tombs near fountain on east side of valley south of Yebrûd.

PAGE 349. After *P. eriocarpa.* **P. Moabitica,** Post (Bull. Herb. Boiss., III, 156). ⊙ .1 to .25, papillose-hairy or glabrescent, forked-branching from base. Leaves *all ternatisect* into petiolulate, *oblong to cuneate,* lobed and dentate segments; petioles winged, ciliate-margined. Umbels with 4-6, nearly equal, filiform rays, .01 to .015 long; fruit

ovate-oblong, .0015 long, shorter than pedicel, white-hispid; stylopodium reversed top-shaped, separated at tip, half as long as tapering, straight styles — April — Wadies east of Dead Sea, and Jordan Plain.

PAGE 350. After *S. capillifolia.* **S. Hermonis,** Post (Bull. Herb. Boiss., I, 399). ② or ① 1; tuber as large as a filbert, globular, fibril-bearing beneath; stem slender, terete, paniculate-branched. Leaves * *, *the upper reduced to a long caudate sheath.* Umbels with 2-3, equal rays, .012 to .025 long; involucre leaves 1-2, lanceolate-subulate, much shorter than rays; involucel leaves 4-8, lanceolate, tapering, unequal, half as long as pedicels; fruit nearly globular, .002 long, shorter than the longest pedicels; stylopodium depressed-mamillary, shorter than recurved styles—June—'Ain-esh-Sha'arah (Hermon); Kurd Dagh.

PAGE 351. Before *G. Haussknechtii.* **G. pterocarpum,** Boiss. ♃ .2 to .35, sparingly corymbose-branched. Leaves linear in outline, .1 long, .01 broad, pinnatisect into crowded segments, dissected into capillary lobes ending in a white bristle. Umbel with 5-9, unequal rays, the longest .05 to .06 long in fruit; fruit short-pedicelled, truncate at base and tip, .01 to .016 long, wings *broader* than seed — June — Kurd Dagh.

PAGE 352. After *C. Libanoticum.* **C. aurantiacum,** Post (Plantæ Postianæ, III, 8). ② 1; stem erect, striate, sparingly hirtulous, forked, panicled-cymose. Lower leaves *white-hispidulous,* oblong in outline, .1 or more long, .04 broad, *tripinnatipartite,* segments of all orders oblong, lobules .002 long; upper leaves pinnatipartite into capillary lobes. *Leaves of involucel and lanceolate petals orange-colored;* fruit linear, .01 long, .0015 thick, *club-shaped at tip;* styles divergent, twice as long as depressed-conical, broad-margined stylopodia — July and August — Subalpine grain fields between Sikr-Ibrîsah and el-Merj-eṭ-ṭawîl (Northern Lebanon).

PAGE 360. Before *F. pauciradiata.* **F. Kurdica,** Post. ♃ 1 or more, glabrous, glaucous; root-stock thick, horizontal; stem terete, leafy, panicled above. Leaves triangular-ovate in outline, ternately bipinnatisect, axes distant, the lower leaves .25 to .3 long and broad, lobules clustered, .003 to .005 long, .001 broad, thick, mucronulate. Rays .02 to .05 long, unequal, 3-4; leaves of involucre and involucel lanceolate-linear; pedicels short — June — Kurd Dagh.

PAGE 362. After *J. dichotoma.* **J. Westii,** Post (Plantæ Postianæ, III, 9). ② 1 to 1.5, glabrous, glaucous; stem terete, striate, paniculately much-branched. Leaves oblong in outline, lower tripinnatiparted, .3 long, .04 broad, primary segments distant, secondary ovate-orbicular, .004 to .007 long, few, oblong, flat, .002 to .004 long, .001 broad; upper leaves reduced to oblong-lanceolate sheaths. Rays 1-3, unequal, .02 to .05 long, 3-6 times as long as umbellets; leaves of involucel ovate, one-third as long as pedicels; pedicels 7-10, longer than fruits; (immature) mericarps elliptical, convex, central area distinct from fungous margin; vittæ indistinct — July — Fields, a little distance from base of Ḥalîmat-Qobu, just at top of Wadi Theniyyet-er-Râs.

PAGE 380. After *O. Capensis.* **O. Schimperi,** Presl. ♃ .5 to .6; stems numerous, wand-like, rigid, punctate-scabrous below, glabrous above, forked, loosely corymbed. Leaves glabrous, linear, taper-

ing at base, acute at tip. Stipules tooth-like. Pedicels much shorter than flower; calyx-teeth ovate-triangular, acute, shorter than tube; corolla blue, .016 long, lobes oblong-linear, one-third to one-fourth as long as tube — April — Gravel; Wadi Ḥebrân (Sinai).

PAGE 383. After *G. Bocconi.* **G. Shepardi**, Post. ♃ .3 to .5, glabrous, turning blackish in drying; stems numerous, ascending from a woody base, quadrangled, more or less long-panicled above. Leaves in sixes, oblong-lenticular, .015 to .025 long, .002 to .004 broad, mucronate, scabridulous at margin. Pedicels usually longer than flowers; corolla .002 long, pinkish, lobes oblong, obtuse; fruit glabrous — July and August — Gaiour Dagh (Amanus).

PAGE 385. After *G. aureum*. Var. **oblongifolium**, Boiss. Leaves oblong to ovate. Panicle contracted — Gaiour Dagh (Amanus).

PAGE 386. After *G. jungermannioides*. **G. Petræ**, Hart. .25 to .3, hispidulous; stems diffuse, 4-angled, brittle. Leaves in fours, linear, 1-nerved, stiff, .008 long, .001 broad, acute, scabridulous at margin. Cymes axillary and terminal, few-flowered, and 2-4 times as long as leaves; pedicels capillary; corolla .002 broad; fruit (immature), hispid with hooked hairs — Winter — Petra.

PAGE 392. After *A. humifusa.* **A. Ghautensis,** Post (Plantæ Postianæ, III, 10). ♃ Hirsute, turning blackish in drying; stems climbing, ending in broad panicles. Leaves in threes or pairs, oblong-lenticular, .004 to .01 long, .0015 to .003 broad, muticous, the lower reflexed. Cymes loose; corolla greenish-yellow, sparingly hairy without, funnel-shaped, lobes oblong, revolute, rather obtuse, longer than tube; anthers oblong; style bifid at tip; fruits minute, hispid — July and August — El-Ghauṭah (Damascus).

PAGE 402. Before *S. Ucranica.* **S. Kurdica,** Post (Plantæ Postianæ, IV, 7). ♃ .45 to .5, velvety with intermixture of longer hairs; stems numerous, simple or sparingly branched. Lower leaves oblong-spathulate, entire, silky, tapering into a petiole, .01 to .035 long, the rest .04 long, pinnatisect into a few, oblong to linear lobes, the terminal lobe oblanceolate, entire or irregularly dentate. Peduncles long, naked; head flattened-hemispherical, .02 broad; scales of involucre lanceolate, hirsute, half as long as flowers; corollas woolly outside, pink, scarcely radiating; involucel very villous; awns of calyx twice as long as purple, 28-34-rayed crown — September — Kurd Dagh.

PAGE 413. Before **ERIGERON**.

ASTER, L. Aster.

Head usually radiate, rarely discoid. Rays in one row, pistillate. Disk flowerets tubular, perfect. Involucre imbricated. Receptacle naked. Akene flattened, beakless. Pappus hairy, in 1-∞ rows — Perennial, rarely biennial herbs.

A. Amani, Post. ♃ .6, glabrous; stem striate, simple, corymbose above, leafy. Leaves oblong-linear, .03 to .04 long, .004 to .005 broad, 3-nerved toward tapering base, acutish. Peduncles .02 to .03 long, beset with short, linear bracts; heads few, .008 broad; scales of involucre oblong, obtuse, 3-nerved, the inner more than half as long as narrow, pale pink rays; disk flowerets two-thirds as long as rays; hairs

of pappus equal, as long as flowerets; akenes appressed-bristly -- September -- Amanus, above 'Othmanîyeh (Plain of Issus).

PAGE 413. After *E. alpinum.* **E. Shepardi,** Post (Plantæ Postianæ, v, 8). ♃ .6 to .8, pubescent; stems erect, corymbose panicled above. Leaves entire, acute, the radical oblanceolate, tapering to a petiole, the lower cauline oblanceolate, tapering at base, the upper oblong-linear, sessile. Involucre pubescent, scales linear, acuminate, with tawny rib, and straw-colored, scarious margin, three-fourths as long as fawn-colored pappus; rays pale, linear, a little longer than pappus — July — Amanus.

PAGE 432. Before *A. montana.* **A. flabellata**, Post (Plantæ Postianæ, v, 9). ♃ .3, appressed-silvery-silky; trunks prostrate or ascending, bearing sterile and fertile stems. Leaves of sterile stems *fan-shaped*, bipinnatipartite into linear, undivided or bifid lobules, .004 to .006 long, .001 broad; leaves of simple or sparingly branched fertile stems ovate in outline, 2-1-pinnatipartite into lobules longer than those of sterile stems. Heads solitary, small; involucre pubescent, scales lanceolate, scarious-margined; rays yellow, about twice as long as involucre, oblong, obtuse, entire; akenes ribbed-angled, with a short crown — July — Amanus.

PAGE 439. Before *P. leucophyllum.* **P. depauperatum,** Post (Bull. Herb. Boiss., III, 158). ♃ .15 to .25, woody at base, appressed-silvery-silky; stems numerous, ascending, the fertile with scattered, minute leaves to tip. Leaves ovate in outline, petioled, fan-shaped, bipinnatiparted into linear, acute lobules, .003 to .004 long, .001 broad. Corymb terminal, dense, 3-10-flowered, .01 to .015 broad, capitate; pedicels half as long as .004 long, .001 broad, obovate-conical heads; scales of involucre oblong, obtuse, the interior scarious at tip; crown half as long as ribbed akene — August and September — Subalpine regions; Gaiour Dagh (Amanus).

PAGE 443. After *S. doriæformis.* **S. Othonnæ,** M. B., 1 to 2, glabrous except sparingly puberulent under surface of leaves; stem striate, ending in a broad corymb. Lower leaves petioled, oblong-lanceolate in outline, often .5 long, .08 to .2 broad, pinnatisect into 6-10, oblong-lanceolate, acute, incised-dentate segments on each side of petiole, the lower often 2-parted; upper leaves sessile, lobes narrow; floral leaves linear, undivided. Heads cylindrical, .01 long, .003 broad, 5-7-flowered; scales of involucre 5, glabrous, linear-spathulate, squamules few, short; rays 1-2, thrice as long as involucre; akenes silky; pappus twice as long as involucre — Summer — Amanus.

PAGE 449. After *C. corymbosa*, var. *Libanotica.* Var. **microcephala,** Post. Heads compact, .01 to .02 broad; outer scales of involucre .015 to .02 long — Izra' (Leja); Gergesa; Nebo.

PAGE 451. After *C. foliosa.* **C. Postiana** (Winkler, Synopsis Cousiniæ, p. 223). ② .4; stem cobwebby, branched, leafy, many-headed. Leaves oblong-lanceolate, sinuate-pinnatilobed, the lower petioled, the upper sessile, decurrent, lobes triangular, spiny; uppermost leaves forming an involucre to the heads, all cobwebby. Heads solitary or twin, ovoid-conical, as large as a hazelnut, about 20-flowered; scales of involucre 50 or more, erect, spiny-mucronate — July — Wadi-el-Mâl (Antilebanon).

Page 458. After *C. Syriaca.* **C. Auranitica**, Post (Bull. Herb. Boiss. I., 400). ♃ 1 or more; stems cobwebby, canescent. Lower stem leaves .6 long, .25 broad, sessile, decurrent, ovate-lanceolate in outline, glabrescent at upper, cobwebby at lower surface, pinnatisect into long-lanceolate, decurrent, entire or short-lobed segments, lobes short-triangular, ending in a strong spine. Corymbs of 2-5, peduncled heads; heads ovate-turbinate, .1 long, .08 broad; involucre constricted at tip, glabrous, scales coriaceous, reddish, the lower reflexed or spreading, appendix triangular-lanceolate, long-tapering, the upper appressed, ending in an ovate, short-tapering, spiny-mucronate appendix; flowerets deep purple; akenes somewhat tetragonal — July and August — Fields; Jaulân and Ḥaurân.

Page 460. Before **SERRATULA.**

AUTRANIA, C. Winkler et Barbey. Autrania.

(Plantæ Postianæ iii, 11, 12).

Heads homogamous, flowerets equal, perfect. Scales of involucre in 5 rows, green at base, the outer and middle narrowing abruptly into a spine, the inner with a deltoid, scarious appendix, with dark, tawny base, somewhat fringed margin, and spinescent tip. Receptacle flat, sparingly bristly. Anthers sagittate at base. Akenes squamous-wrinkled, obpyramidal, 4-5-angled. Pappus of ∞ rows of bristles, the inner feathery, the outer shorter, not feathery — Perennial, alpine plants.

A. pulchella, Winkler. ♃ .05, nearly stemless, 1-headed. Leaves rosetted at top of root-stalk above vestiges of old leaves, short-petioled, oblong-spathulate in outline, .03 long, .01 broad, pinnatifid or lyrate, appressed-canescent on both sides, ciliate-dentate at margin, lobes 3-4 pairs, oblong-ovate, spiny-mucronulate, terminal ovate. Head obovate, .035 long, .025 broad at tip; scales of involucre hirsute or appressed-pubescent under base of appendix, ovate to oblong and linear, about as long as spiny appendix; flowers pale pink, longer than scales — July — Rijâl-el-'asherah (Northern Lebanon), 2600 m.

Page 464. After *C. laxa.* **C. Amani**, Post. (Plantæ Postianæ v, 9). ♃ .4, white with appressed, detersile wool; stems angled, corymbose-panicled from lower third. Leaves obsoletely dentate, pitted, the lower oblong in outline, .06 to .1 long, petioled, entire or pinnately divided into oblong segments, the terminal larger, rhomboid-ovate; stem-leaves sessile, with narrower segments, the uppermost oblong, undivided, small, bract-like. Heads ovate-turbinate, .01 long, .007 broad; scales of involucre appressed-tomentellous, ovate, pale, ending in a triangular, straw colored, 7-13-pectinate appendix; flowerets deep pink; pappus white — August — Amanus.

Page 467. After *C. Haussknechtii.* **C. sclerolepis**, Boiss. ♃ 1; stem sparingly cobwebby, leafy below, simple, racemose-3-7-headed above. Leaves pubescent-scabrous, petioled, lyrate-pinnatipartite, the lower on a petiole .15 long, with 2-4, lateral, small, ovate segments, and a terminal, oblong segment .07 to .1 long; other leaves oblong-lanceolate, short-decurrent. Peduncles beset with scarious, tapering scales, as long as heads; heads globular, .03 in diameter; scales of involucre coriaceous-scarious, white, glossy, entire or obsoletely denticulate-fringed at margin, ovate to oblong, ending abruptly in a

spine, which in the middle ones is as long as scale; flowerets pink — July — Marash.

PAGE 471. After *C. Cheiracantha.* Var. **longispina,** Post. Segments of leaves *linear, elongated.* Spines of involucre *one-third* as long as head -- Woods; Mt. Cassius.

Var. **latifolia,** Post. Most of the leaves undivided, the upper and terminal segment of lower (when lyrate) *oblong-lanceolate*, .02 to .01 broad — Amanus.

PAGE 473. After *C. lanatus.* Var. **latifolius**, Post. Leaves of stem and involucre broader, glabrescent -- Galilee; Cœlesyria.

Var. **proliferus**, Post. Low, .1 to .25, *proliferous.* Leaves as in last - - Common.

PAGE 483. Before *H. prœaltum*, Vill. **H. Pelleterianum**, D.C. ♃ Root-stock præmorse, stoloniferous; stems 0. Leaves rosetted, oblong-spathulate, .03 to .05 long, .01 to .02 broad, stellate-tomentellous, and upper surface with long, tawny bristles from a bulbous base. Scapes .1 to .3 high, sparingly tomentellous, and beset with black, stipitate glands. Heads hemispherical, .02 broad; scales tomentellous and black-stipitate-glandular, oblong, scarious-margined, — July — Amanus.

PAGE 484. After *H. Balansœ.* **H. strigulosum**, Post (Plantæ Postianæ, v, 11.) ♃ .5 to .8, clothed with long hairs from dilated base, mixed at inflorescence with short hair. Stem-leaves oblong, acute, .1 long, .02 broad, sessile, repand-dentate, the lowest half-clasping at base. Heads racemed-panicled, .02 long; scales acute, puberulent, the midrib sparingly beset with black prickles — July — Amanus.

PAGE. 484. After *H. Libanoticum.* **H. vulgatum**, Koch. ♃ 1 or more, more or less hirsute or glabrescent; stem leafy, corymbose-panicled above. Leaves oblong-lanceolate, .05 to .1 long, acute, coarse-serrate, the cauline sessile. Peduncles and acute scales of .02 long heads puberulent, more or less black-glandular-hairy — Summer -- Amanus.

H. Barbeyi, Post (Plantæ Postianæ v. 10). ♃ 1 or more, green, sparingly beset with hairs from a tubercle. Leaves repand-dentate, lower tapering to a margined petiole, obovate-spathulate, .2 long, .05 broad; middle leaves similar but sessile, half-clasping; upper sessile, oblong-ovate, cordate-auricled, half-clasping at base, .05 to .01 long, .03 to .01 broad, obtuse to acute. Inflorescence corymbose-panicled: peduncles beset with black glands, and short, lanceolate-subulate bracts; heads .012 long; scales acute, scarious-margined, beset with black, glandular hairs — July — Amanus.

H. Autrani, Post (Plantæ Postianæ v, 11.) ♃ Root-stock præmorse; stem .3 to .5, thyrsoid-panicled from base, clothed with short wool and long, wavy hairs, arising from a tubercle. Leaves repand-denticulate, sparingly beset with bristles from a tubercle, lowest ovate-oblong, acute, with petiole .1 to .15 long, .03 to .04 broad; cauline ovate to ovate-lanceolote, .03 to .01 long, acuminate, sessile, the upper smaller, bract-like. Heads .015 long; scales acute, white-bristly, scarious margined — July — Amanus.

PAGE 488. Before *L. viminea*, L. **L. muralis**, L. ♃ 1 or more, glabrous; root præmorse; stem leafy. Leaves tender, the lower long-

petioled, the rest with a short, winged petiole, auricled at base, all lyrate-pinnatisect, the terminal segment cordate or hastate, 3-5-lobed, the lateral lobes 2-3 on each side, decurrent, coarse-lobed. Peduncles elongated, filiform; heads cylindrical; scales glabrous, the lower minute, ovate, the upper lanceolate, obtuse; flowers sulphur-colored; akenes black, elliptical, compressed, 5-ribbed on each side, ending in a short beak.

Var. **sinuata**, Post (Bull. Herb. Boiss., III, 159). Lowest leaves not lobed, petiole narrow-winged, lamina obtusely 5-lobed or coarse-serrate; stem-leaves auricled at base, sinuate or obscurely angled-lobed on each side, ending in a broad-rhomboid, entire, coarse-serrate lobe, or this lobe hastate, or 5-serrate-lobed and serrate — August and September — Gaiour Dagh (Amanus).

PAGE 491. After *Z. glomerata*, Cass. **Z. Foxii**, Post. ⊙ .1 to .25, glabrous; stems simple or forked. Root-leaves linear-lanceolate, tapering to a petiole, .06 to .08 long, .01 broad, coarsely incised-dentate and denticulate, with narrow, triangular teeth ending in a cartilaginous tip; cauline leaves oblong, decurrent, irregularly coarse-serrate. Heads solitary, .015 long, half to one-fourth as long as bracted peduncles; scales oblong-ovate, white-tipped; akenes white, fungous, appressed-silky, lateral wings hyaline, eroded, rather narrower than akene; pappus silky, twice as long as akene, persistent — April — Between Jebel Usdum and 'Ain Jidi.

PAGE 502. Line 6, should be † † *Style glabrous below, hairy above.*

Line 7, read, in place of TRACHELIUM, TRACHELIOPSIS.

PAGE 507. Instead of **TRACHELIUM.**

TRACHELIOPSIS, Buser (Gen. Nov. Bull. Herb. Boiss., II, 524).

Flowers cream-colored, or pale blue. Sepals more or less linear, erect or spreading. Corolla funnel-shaped, lobes oblong-triangular, somewhat hooded at tip. Stamens 5, anthers linear, apiculate. Ovary inferior, 3-celled, ovules numerous. Style twice as long as corolla, glabrous below, hairy above, stigmas 3, lanceolate or lingulate. Capsule erect, pyriform, with pores at base. Seeds oblong, wheat-like or almond-shaped, tawny or yellowish, glossy, somewhat lined — Perennial herbs with fleshy root-stock and brittle stems. The two species described under Trachelium, p. 508, belong to this genus.

PAGE 526. After *V. canescens.* **V. parviflorum,** D.C. .3 to .6; stems erect, puberulent, stiff-branched. Leaves somewhat fleshy, rounded at base, petioled, ovate-oblong-obtuse, to lanceolate-tapering, .03 to .06 long. Umbels axillary, sessile or peduncled; pedicels longer than flowers; calyx-lobes triangular; corolla yellowish-red or purple, .003 broad, lobes oblong, obtuse; *crown reduced to* 5, *short, purple glands;* follicles linear-lanceolate, glabrous, .06 long — July — Haurân.

PAGE 532. After *C. Myxa.* **C. Gharaf**, Forsk. ♄ *Gharaf.* 3 to 5. Leaves short-petioled, *oblong-spathulate*, .04 to .06 long, .01 to .015 broad, minutely puberulent, light-green. Cymes loose; calyx-teeth broad-triangular, very short; corolla tube shorter than calyx, lobes rounded; anthers barely exserted or included; stigmas linear-club-shaped; drupe orange-colored, round-ovate, .007 long — July and August — 'Ain-Jidi.

PAGE 539. Between **ECHINOSPERMUM** and *

* *Nutlets adherent by inner face and margins, with prickly wings at back.*

E. Szovitsianum, F. et M. ⊙ .2 to .4, rough with short bristles arising from a tubercle; stem more or less branching from base. Leaves linear-spathulate to linear, .02 to .04 long, .0015 to .004 broad. Racemes loose; bracts longer than pedicels and fruits; fruiting pedicels thick, recurved, 1-3 times as long as fruits; lobes of calyx linear, about as long as fruit; wings of nutlet with 5-6, triangular-acuminate prickles — May — Baalbek.

PAGE 544. *Anchusa Shattuckii,* Post, is **A. Aucheri,** Alph. D. C. Var. **brunneo-purpurea,** Post.

PAGE. 562. Before *C. stenophyllus.* **C. Armenus,** Boiss. et Ky. ♃ Hirtulous, pale green. Leaves sagittate-hastate at base, triangular-lanceolate, the lower long-petioled, .07 long, somewhat dentate near base, the auricles deeply and obtusely 2-3-lobed; the upper hastate-lanceolate, acuminate. Peduncles much longer than leaves, 3-7-flowered; pedicels as long as calyx or longer; bracts setaceous; sepals oblong-lanceolate, acuminate; corolla pale pink, .025 long, four times as long as calyx; seeds tubercled and wrinkled — Spring — Aintâb.

PAGE 566. Analytical table of **SOLANACEÆ** after LYCIUM.

ATROPA. ♃ Herbs. Flowers solitary or twin in axils. Fruiting calyx unchanged.

PAGE 576. Before *V. Sinaiticum.* **V. Shepardi,** Post ② .3 to .6, pannous with yellowish-grey wool, panicled above. Root leaves obovate to oblong, .1 to .2 long, .02 to .04 broad, tapering to a petiole; stem-leaves at base of branches cordate-clasping, acuminate. Flowers 2-4 together, in compact racemes; pedicels as long as flowering calyx or shorter; calyx .002 long, parted nearly to base into oblong-lanceolate, obtusish teeth; corolla *; capsule oblong, .004 long — Summer — Gaiour Dagh (Amanus).

PAGE 754. After 3. EPIPACTIS. SPIRANTHES. Leaves rosetted at base. Perigonium white, .006 long, at right angles to ovary.

PAGE 756. Before **TINÆA.**

SPIRANTHES, Rich. SPIRANTHES.

Perigonium ringent, forming a right angle with the ovary. Labellum grooved, with two warts at base, undivided, somewhat enclosed in the lateral petals. Column somewhat half-terete, beak bifid, erect. Anther movable, free, incumbent on beak. Pollinia 2, bifid, somewhat club-shaped, attached to an oblong gland. Ovary twisted — Small-flowered perennials, with spiral inflorescence, and fusiform tubers.

S. autumnalis, Rich. ♃ .2 to .4; tubers minutely papillary. Leaves rosetted at top of tubers, ovate to oblong, petioled. Flowering scape lateral, beset with appressed, lanceolate sheaths; spike slender, .05 to .1 long, pubescent-glandular; bracts ovate-triangular, cuspidate, longer than ovary; labellum obovate-oblong, crenulate at tip — October and November — Rocks at mouth of Dog River.

PAGE 810. Before **JUNCUS.**

LUZULA, D. C. WOOD-RUSH.

Perigonium glume-like, divisions 6, coherent at base, equal or somewhat unequal. Stamens 6, inserted at base of perigonium. Ovary 1-celled, with 3, erect ovules. Style 1, filiform, stigmas 3, filiform, villous. Capsule 3-celled, 3-valved — Perennials, with flat leaves, sheathing at base.

L. Forsteri, Sm. ♃ .3 to .4; root-stock fibrous; stems tufted. Branches of corymb 1-3-flowered; pedicels erect, even in fruit; capsule triquetrous, acute — April — Middle zone of Lebanon.

PAGE 834. After *S. Libanoticus.*

* * * * *Inflorescence terminal, compound-umbellate, spikelets sessile,* 4-5 *in a cluster, subtended by* 4, *glume-like bracts.*

S. umbellatus, Post. ⊙ .3; roots fibrous; culms clustered, triquetrous, leafy. Leaves flat, narrowly linear, overtopping inflorescence. Involucre leaves similar to cauline, the longer ones *many times longer than umbel,* leaves of involucels similar but narrower, all scabrous-margined; bracts boat-shaped, ovate-oblong, scarious except green midrib, which is excurrent in a long mucro or cusp; glumes oblong-lanceolate, scarious, with a green midrib, mucronate — April — Wadi Draa' (Moab).

PAGE 39. Before *R. myosuroides.* **R. orbiculatus,** Bl. (Boiss. Suppl. Fl. Or., p. 5). ♃ .1 to .2, sparingly hairy; neck fibrous. Root-leaves long-petioled, *cordate-orbicular,* obtusely 5-lobed, lobes crenate or lobuled. Scapes 1-flowered, with a few, minute, sessile, 3-lobed leaves, the upper 2 opposite; flower rather large; sepals oblong-orbicular, persistent; petals yellow, at length reddish, obovate, twice as long as calyx; fruiting head globular, .008 in diameter; carpels triangular-ovate, flattened, .002 long, as long as or a little longer than slender, straight beak — May — Walls of castle, Qal'at-el-Fakhrah (Lebanon).

PAGE 148. After *S. apetala.* **3. S. maritima,** Don. ⊙ .03 to .05, glabrous; stems spreading, ascending. Leaves muticous or short-apiculate. Sepals ovate, obtuse, muticous, shorter than capsule; petals lanceolate, about as long as sepals or 0 — Spring — Rocks; Râs-Beirût.

Erratum in Addenda, p. 5. Instead of Page 112. After *R. Kahirina,* read Page 112. After *R. lutea.* **R. Kahirina.**

N.B.—After the printing of the Addenda, pp. 57-64, and 69-72 were reprinted. The Addenda belonging to those pages were introduced into the text.

INTRODUCTION.

THE region covered by this Work is unequalled by any of the same size on the globe, not only for the thrilling and important events of human history of which it has been the theatre, but for its unique geological structure, its great diversity of surface and climate, and its remarkable fauna and flora. It is the meeting point of three continents*, and, as such, a link of connection between them all. It is marked geographically by two mountain systems parallel to one-another and to the coast, and extending from the Taurus to the latitude of Ras Muḥammad.

The northernmost chain of the western system, Gaiour Dagh (Amanus), extends from the valley of the Ak Su, near Marash, southward to the valley of the lower Orontes. Its loftiest peak is about 8000 feet high. From the mouth of the Orontes to the Nahr-el-Kebîr extends the Nusairy chain. A spur of this chain, Mount Cassius, rises abruptly from the sea just south of the mouth of the river, and attains a height of 6400 feet. The rest of the chain lies a little more inland, occasionally approaching the sea. Its highest summits hardly reach 4000 feet. From the Nahr-el-Kebîr to the Qâsimîyeh (the lower Leontes) stretche the noble chain of Lebanon, the highest peak of which is not less thai 10,220 feet above the sea. From the Qâsimîyeh to the Debbet-er-Ram leh is a series of chains of hills and mountains of which Jebel Jermuk in Galilee is 3934 feet high. Summits nearly as high overlook Hebron, and the plateau of the Tîh. Debbet-er-Ramleh, a broad plain of shifting sands, separates the Tîh from the rugged, bald, igneous chain of Sinai. The bold headland of Ras Muḥammad, at the junction of the Gulfs of 'Aqabah and Suez, ends the long mountain system nearly 700 miles from its starting point.

The parallel system commences at the north by a chain of low hills, extending from Kapu Tcham, near Marash, southward to Sôf Dagh and Kurd Dagh, and Jebel Bil'âs and el-Jebel-el-Abiaḍ in the Syrian Desert, and sinks into the broad plain between Hems and Antilebanon, "the entering in of Hamath." Antilebanon rises south of this plain, and trends parallel to Lebanon, varying in height from 4000 to 8700 feet, and ends in the grand mass of Hermon, which dominates northern and eastern Palestine and the Damascus plateau from a height of 9400 feet. A break of about 40 miles occurs between Hermon and the mountains of Gilead. This interval is occupied by the plain of el-Jaulân. This great lava plateau has been formed by the eruptions of the numerous volcanic cones which diversify its surface. It is bounded eastward by an isolated volcanic chain, the Jebel-el-Durûz (Alsadamus), the "hill of Bashan." This chain trends north and south, parallel to the main systems, and appears as if set back from them to a distance of about forty miles. The outpour of lava from its craters has contributed its share to the formation of the fertile wheat fields of Bashan. Its highest cone, el-Qulêb, is 5400 feet above the sea. The main range, broken as above shown by the plain of el-Jaulân, is continued in the mountains of Gilead and Moab, which rise from 500 to 1000 feet above the trans-

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* Asia Minor must be regarded, from the stand point of its Natural History, as belonging to Europe rather than Asia.

Jordanic plateau, and from 3000 to 4000 above the Mediterranean. From the latitude of the southern end of the Dead Sea this range is continuous with that of western Arabia. Its highest peak, Mt. Hor, is 4800 feet above the Mediterranean, and 6100 above the Dead Sea.

Between these two great mountain systems is a cleft, beginning in the valley of the northern affluent of the Orontes, a few hundred feet above the sea level, and extending up the Orontes valley to Cœlesyria, where it attains an altitude of over 4000 feet, and then, following the Leontes and the Jordan, sinks at the Dead Sea to a level nearly 1300 feet below the Mediterranean. From the Dead Sea it rises in the 'Arabah to a height of 600 to 700 feet above the Red Sea, and then sinks again to the sea level, and is continued southward on the floor of the Gulf of 'Aqabah. These grand features of the physical geography of the country are shown in detail on the map which accompanies this sketch.

Skirting the eastern mountain system are the great plains, which extend eastward to the Euphrates and Persia. A large part of these plains is arable, and many of them are exceedingly fertile. But all of them are coterminous with the Syrian Desert. South of the latitude of the Dead Sea mountains and plains alike are desert.

The flora of Amanus, while closely approximated to that of the Taurus, contains a considerable number of plants peculiar to itself. The Nusairy chain has little to distinguish its flora from that of the lower zones of Lebanon. Lebanon, however, from its isolated position, and the considerable height of its alpine summits, has a large and exceedingly interesting flora, containing an unusually large proportion of peculiar species. A noteworthy feature of its alpine region is the almost complete absence of Arctic species. The warm period which succeeded the cold has almost obliterated the glacial plants. Their place has been taken by a highly specialized local flora. The flora of western Palestine is closely allied to that of the foot hills of Lebanon, but as we enter the Tîh it becomes more and more similar to that of Sinai and the Egyptian deserts, which is Arabian and north African. The flora of Kurd Dagh does not differ very greatly from that of Amanus. But that of the desert chains between Aleppo and Ḥems is rich in peculiar species. There can be no doubt that further exploration will result in many new discoveries in this little worked part of our field. Antilebanon, while having much in common with Lebanon, has a much poorer flora, and fewer distinctive plants. The chains of Gilead and Moab differ markedly from those of western Palestine, and every journey illustrates the botanical riches awaiting the explorer into those little known regions. The flora of the Dead Sea chasm has a number of immigrants from the tropical regions of India, Arabia, and Ethiopia. That of the tablelands and plains contains a large number of plants not found elsewhere in our district, but, for the most part, widely disseminated over the same plains outside of our limits.

The very large number of species found in a country so limited is to be accounted for by its microcosmic character. Within an area of 50,000 square miles is found a strip of sea coast, sharing the climatic conditions of the Mediterranean littoral. The western range of hills and mountains, receiving the air from the sea, saturated with moisture, precipitates it in a rainfall of about 36 inches on the coast, and perhaps

50 on the upper zones of Lebanon. These mountains are channeled into deep valleys, some with a general east and west trend, and others north and south, each having a different exposure, an arrangement eminently favorable to the growth of a great variety of species. The air, from which so much moisture has been precipitated, passes over to the parallel chains, which abstract from it a large part of its remaining moisture. The rainfall of the second range is probably not more than half that of the first, while that of the eastern plateau is still less, probably not more than 10 to 12 inches. As a natural result of this physical conformation, the flora of the maritime watershed of the coast range differs considerably from that of its much steeper eastern declivities, and still more from that of the inland range, which again differs strikingly from that of the eastern plateau. The deep chasm of the Jordan and the Dead Sea, with its tropical climate, adds to the variety and numbers of species. The deserts, although useless for agriculture, have a large and most interesting flora, differing almost totally from that of all the other regions. Finally the very considerable difference of latitude, nearly ten degrees to less than two of longitude, has its full share in enriching the number and diversity of forms. As a result of these conditions the district covered by our Work contains 126 Orders of phænogams and acrogens, 850 genera, and about 3500 species. The significance of these figures will appear if we recall that our region is only about as large as England, or as the State of New York.

The author owes it to himself to say that this Work has been prepared under unusual difficulties. He was compelled to collect and arrange the Herbarium on which it is founded. The many thousand species, and scores of thousands of specimens, have been studied and arranged by himself. He has had access to few books of reference, especially of the more costly, illustrated works on Oriental plants. His studies have been pursued in the scant leisure of a life devoted to pursuits in no way germain to Botany. Numerous perilous and costly journeys, undertaken for the purpose of collecting plants, and studying them in their habitats, have absorbed the brief vacations of busy years. His work has been often interrupted by intervals of months, and more than once of one to two years. The task of drawing most of the illustrations, and superintending the execution of the wood cuts, has fallen on him. The printing, which has been achieved in spite of the limited typographical resources of the Mission Press, has been a labor of no trifling magnitude. He trusts that an indulgent public will pass a lenient judgment on imperfections, of which no one is more conscious than himself. He cannot close without acknowledging the assistance of the late Messrs. Boissier of Geneva and Blanche of Syria, and of Messrs. Barbey and Autran of Geneva, and Baker of Kew, in the determination of doubtful plants, and especially in the diagnosis of new species. He is also greatly indebted to Mrs. Shepard of Aintâb, and Rev. H. E. Fox, M.A., of London, for valuable collections of plants of Syria and Palestine, and to Professors Porter and Day, of Beirût, the genial companions, who have shared with him the fatigues and perils of his later journeys, and aided his studies by their advice and criticism.

ANALYTICAL KEY

TO THE PLANTS DESCRIBED IN THIS WORK.

SERIES I. PHÆNOGAMIA. Flowering Plants.

Plants having true flowers, with stamens and pistils, producing genuine seeds, which contain an embryo.

CLASS I. EXOGENÆ. The stem composed of bark, wood, and pith; the bark increasing every year by concentric layers from within, the wood in the same manner from without. Leaves generally netted-veined. Floral envelopes usually in fours and fives.

SUBCLASS I. ANGIOSPERMÆ. DICOLYLEDONS. The pistil consisting of a true ovary containing ovules, the cotyledons two, or in CERATOPHYLLEÆ four.

DIVISION I. POLYPETALÆ. Flowers having both calyx and corolla, the latter of separate petals.

A. *The stamens more than* 10, *or more than twice as many as petals.*

1. *The calyx free from the pistil or pistils.*

Pistils generally numerous, separate or united in flower, separate in fruit. — Page
- Implanted on inner aspect of calyx-tube. . . . . . . Rosa, 308
- Implanted on the torus (*receptacle or thalamus*).
  - Stamens implanted on calyx, separate. . . . . . . ROSACEÆ, 299
  - Stamens adnate to base of petals, 1-adelphous. . . . . . MALVACEÆ, 174
  - Stamens implanted on torus. . . . . . . RANUNCULACEÆ, 34

Pistils 3-12, united by ovaries, or 1, with 3-6 lobes.
- Placenta in axis. . . . . RANUNCULACEÆ, 34
- Placenta parietal . . . . RESEDACEÆ, 110

Pistil 1, but styles or stigmas sometimes multiple.
- Ovary 8-30 celled; ovules on septa; aquatics . . . . . NYMPHÆACEÆ, 48
- Ovary 5-celled; stamens 1-adelphous; anthers reniform. . . . Hibiscus, 179
- Ovary of 5 cells united (at maturity) by twisted styles. . . . . Monsonia, 190
- Ovary 2-5-celled.
  - Leaves with pellucid or black dots.
    - Stamens 3-5-adelphous . . . . HYPERICINEÆ, 169
    - Stamens 12-15, separate . . . . Peganum, 199
  - Leaves without dots.
    - Calyx of 2, fugacious sepals; fruit a silique. . . . . . Glaucium, 52
    - Calyx imbricated in bud; sepals 5; fruit a capsule. . . . . Glinus, 165
    - Calyx valvate in bud, 5-fid; fruit a drupe or capsule. . . . TILIACEÆ, 180
- Ovary of 1 true or ∞ false cells; sepals 2-3, hood-like, caducous. . PAPAVERACEÆ, 49
- Ovary of 1-2 perfect or 3 imperfect cells; placentæ 3, parietal. . . CISTINEÆ, 114
- Ovary 1-celled; placentæ 2-8, parietal.
  - Desert shrubs, leaves not dotted; fruit an ovate, 1-celled pod . . . Cleome, 108
  - Shrubs, leaves not dotted; stamens separate; fruit a berry . Cratæva, Capparis, 106
  - Shrubs or herbs; leaves usually dotted; stamens 3-5-adelphous; fruit a capsule.
    - Placentæ fixed at base and tip, otherwise free . . . . Reaumuria, 168
    - Placentæ parietal. . . . . HYPERICINEÆ, 169
- Ovary 1-celled, placenta 1, parietal.
  - Herbs with palmate, dissected leaves; fruit a follicle . . . Delphinium, 44
  - Shrubs or trees, with 2-3-pinnate leaves . . . . . . Acacia, 298
  - Shrubs or trees, with undivided leaves. . . . . . . AMYGDALEÆ, 299

2. *Calyx more or less adherent to compound ovary.*

Ovary in two tiers, lower of 3, upper of 5 cells. . . . . . GRANATEÆ, 319

Ovary 2-5-celled.
- Leaves pellucid-dotted. . . . . MYRTACEÆ, 318

Leaves not pellucid-dotted. Page
  Stipulate; trees, fruit a pome . . . . POMEÆ, 301
  Exstipulate; prostrate herbs with fleshy leaves. . . Mesembryanthemum, 326
Ovary 1-celled, half free; calyx-lobes 2. . . . . Portulaca, 165
Ovary 1-celled, inferior, leafles, thorny, succulent plants. . . . CACTACEÆ, 325

B. *Stamens as many as petals and opposite them.*

Ovary 1-celled.
  Anthers opening elastically by valves. . . . . BERBERIDACEÆ, 47
  Anthers not opening elastically.
    Climbing shrubs; flowers minute, in axillary cymes . . . MENISPERMACEÆ, 2
    Herbs; flowers solitary, pedicelled. . . . . PRIMULACEÆ, 515
    Herbs or shrubs; flowers sessile in spikes or heads. . . . PLUMBAGINEÆ, 510
Ovary 2-4-celled.
  Calyx teeth obsolete or small; corolla hood-like, united at tip. . . AMPELIDEÆ, 202
  Calyx 4-5-fid; petals not united at tip. . . . . RHAMNEÆ, 200

C. *Stamens not more than* 10, *or not more than twice as many as petals, or, if as many, alternate with them.*

1. *Calyx free from ovory.*

* *Ovaries 2 or more, separate.*

Stamens united by filaments, anthers anherent to stigma. . . ASCLEPIADEÆ, 523
  Stamens separate, ... CRASSULACEÆ, 313

* * *Ovaries 2-5, more or less united below, separate above.*

Style 1; leaves pellucid-dotted; plants with heavy odor. . . . . . RUTACEÆ, 196

* * * *Ovaries or lobes of compound ovary 5, connected by styles.*

Stamens united in a ring at base. . . . . GERANIACEÆ, 189

* * * * *Ovary single.*

Ovary of 1 carpel; placenta parietal; style or stigma 1; fruit a pod. . LEGUMINOSÆ, 208
Ovary compound with more than 1 cell, placenta, style or stigma
  1-celled, with several stigmas or styles, or placentæ or a loment.
    Corolla irregular.
      Of 2 petals; sepals 2-5; stamens 3. . . . . Oligomeris, 113
      Of 4 petals in pairs.
        Not bilabiate; stamens 4, separate; stigmas 2 . . . . . Hypecoum, 53
        Bilabiate; stamens 6, 2-adelphous; stigma 2-lobed. . . . FUMARIACEÆ, 54
      Of 5 petals.
        Stamens 5; stigmas united. . . . . VIOLARIEÆ, 118
        Stamens 10, 5 with anthers, 5 without. . . . . . . MORINGEÆ, 207
    Corolla regular or nearly so.
      Seeds 1-2 at base of cell or pendulous.
        Trees with or without Turpentine odor; stigmas 3. . . ANACARDIACEÆ, 205
        Herbs or shrubs; styles 2-3 . . . . PARONYCHIEÆ, 158
      Seeds more than 1, in axis or at base; herbs.
        Calyx gamosepalous.
          Exstipulate . . . . SILENEÆ, 121
          Stipulate . . . . POLYCARPEÆ, 158
        Calyx polysepalous.
          Herbs . . . . ALSINEÆ, 147
          Shrubs or trees . . . . Tamarix, 166
      Seeds numerous, on 2 or more parietal placentæ.
        Erect herbs or shrubs; placentæ 2. . . . . Cleome, 107
        Prostrate herbs or small shrubs. . . . . FRANKENIACEÆ, 121
        Bog-herbs; glandular-hairy; placentæ 3-5. . . . . . DROSERACEÆ, 317
  2-∞-celled.
    Flowers irregular.
      Stamens 1-2-adelphous.
        8, adherent to corolla; anthers 1-celled, opening at tip. . . POLYGALACEÆ, 120
        10, free; pod more or less divided by approach of sutures . . Astragalus, 253
    Flowers regular or nearly so.
      Stamens 2-3; petals 4; shrubs or trees . . . . OLEACEÆ, 519
      Stamens 6, tetradynamous . . . . CRUCIFERÆ, 57

Stamens as many or twice as many as petals.
Ovules 1-2 in each true or false cell.
Herbs. Page
Capsule with 3, 1-ovuled cells . . . . Andrachne, Crozophora, 726
Capsule with 5 true or 10 false cells. . . . . . LINACEÆ, 181
Shrubs or small trees.
Leaves ovate, leathery; fruit a berry. . . . . Ilex, 9
Leaves ovate, leathery; fruit an olive-shaped drupe. . . . Balanites, 199
Leaves oblong-elliptical; fruit a capsule. . . . . . Euonymus, 200
Leaves palmate; fruit a key or capsule. . . . . . SAPINDACEÆ, 204
Ovules 2 or more in each cell.
Exstipulate.
Stamens 10, 1-adelphous at base; leaves trefoil . . . OXALIDEÆ, 196
Stamens separate.
Style 1; calyx more or less gamosepalous. . . . LYTHRARIEÆ, 319
Styles 2; calyx 5-fid or parted . . . . Saxifraga, 312
Styles 2-5; calyx gamosepalous. . . . . . . SILENEÆ, 121
Stipulate.
Style 1; sepals 5; petals 4; stamens 4 . . . . . Tetradiclis, 198
Style 1; calyx and corolla 4-5-merous . . . . ZYGOPHYLLEÆ, 184
Styles 3; calyx and corolla 5-merous. . . . . . Telephium, 164
Styles as many as sepals. . . . . ELATINEÆ, 168

2. *Calyx adherent to ovary, or to disk lining its tube.*

Tendril bearing; fruit a pepo or berry. . . . . . . CUCURBITACEÆ, 322
Without tendrils.
Ovules more than 1 in each cell.
Ovary 1-2-celled.
Fleshy herbs; fruit a pyxis; style 5-6-fid. . . . . . PORTULACACEÆ, 165
Herbs or shrubs: fruit a capsule or berry: styles 1-2. . . . SAXIFRAGACEÆ, 312
Ovary 2-6-celled: style 1.
Stigma 4-6-lobed or capitate. . . . . ONAGRARIEÆ, 321
Stigma trifid . . . . Podanthum, 506
Ovules 1 in each cell.
Stamens 8: aquatics, with dissected leaves. . . . . . HALORAGEÆ, 318
Stamens 10: prostrate herbs . . . . Neurada, 309
Stamens 2: calyx-lobes 2: petals 2 . . . . Circæa, 13
Stamens 5. Flowers umbelled or capitate: fruit of 2 mericarps . UMBELLIFERÆ, 327
Stamens 5-10: climbing herbs, with glossy leaves; fruit a berry. . . Hedera, 377
Stamens 4-5.
Shrubs or trees: leaves opposite: fruit a 2-seeded drupe . . . . Cornus, 377
Shrubs or trees: leaves alternate: fruit a drupe or capsule. . . RHAMNEÆ, 200

DIVISION II. MONOPETALÆ. Petals more or less united.

A. *Stamens more numerous than corolla lobes.*

Ovaries 5: stamens 10 . . . . Umbilicus, 314
Ovary 1-celled.
Placenta 1, parietal.
Corolla papilionaceous. . . . . LEGUMINOSÆ, 208
Corolla spurred. . . . . Delphinium, 44
Corolla regular . . . . MIMOSEÆ, 211
Placentæ 2, parietal: petals in pairs, irregular. . . . . . FUMARIACEÆ, 54
Ovary 2-celled.
Cells 1-ovuled . . . . POLYGALACEÆ, 120
Cells ∞-ovuled . . . . Withania, 568
Ovary ∞-celled.
Stamens free from corolla, or nearly so, separate . . . . . ERICACEÆ, 508
Stamens implanted at base of corolla or on its tube.
Filaments 1-adelphous: anthers reniform, 1-celled. . . . . MALVACEÆ, 174
Filaments 1-∞-adelphous at base. . . . . STYRACACEÆ, 518

B. *Stamens having anthers as many as corolla-lobes and opposite them.*

Ovary 1-celled.
  Capsule ∞-ovuled : style 1. . . . . PRIMULACEÆ, 515
  Utricle 1-seeded : styles 5 or 1 with 5 stigmas. . . . . . PLUMBAGINEÆ, 510

C. *Stamens as many as corolla-lobes, alternate with them, or fewer.*

1. *Ovary adherent to calyx-tube, i.e., inferior.*

Tendril bearers, anthers sometimes united. . . . . . . CUCURBITACEÆ, 322
Tendrils 0.
  Anthers syngenesious.
    Filaments separate : flowers axillary. . . . . Ecballium, 324
    Filaments separate : flowerets in involucred heads. . . . . COMPOSITÆ, 405
    Filaments more or less united : flowers scattered, bilabiate. . . LOBELIACEÆ, 501
  Stamens separate.
    Free from corolla. . . . . CAMPANULACEÆ, 501
    Implanted on corolla.
      Less in number than corolla-lobes.
        Corolla funnel-shaped. . . . . VALERIANACEÆ, 394
        Corolla bilabiate. . . . . Morina, 399
      2-5, usually as many as corolla lobes.
        Flowers usually in an involucred head. . . . . DIPSACEÆ, 399
        Flowers in cymes or panicles.
          Leaves opposite, exstipulate and entire, or stipulate and pinnate. . . . . CAPRIFOLIACEÆ, 378
          Leaves whorled, exstipulate, or opposite, stipulate. . . RUBIACEÆ, 379

1. *Ovary free from calyx, i.e. superior.*

* *Corolla irregular : stamens with anthers only 4 or 2.*

Ovules 1 in each cell : cells 1-4.
  Ovary 1-celled : inflorescence globular. . . . . GLOBULARIEÆ, 608
  Ovary 4-lobed. Aromatics with labiate flowers. . . . . . . LABIATÆ, 611
  Ovary 2-4-celled, not lobed. . . . . VERBENACEÆ, 609
Ovules numerous, or at least 2 in each cell.
  Ovary and capsule 1-celled.
    Herbs without leaves, parasitic. . . . . OROBANCHACEÆ, 601
    Herbs, aquatic or marshy, with dissected leaves. . . . LENTIBULARIEÆ, 605
  Ovary and capsule 2-celled : placentæ central.
    Seeds few, borne on hook-like processes. . . . . . . ACANTHACEÆ, 606
    Seeds many or few, not on hook-like processes. . . . SCROPHULARIACEÆ, 571
  Ovary and capsule incompletely 4-celled. . . . . PEDALINEÆ, 606

** *Corolla slightly irregular : fertile stamens 5.*

Filaments, or some of them, woolly : fruit a 2-celled capsule. . . Verbascum, 573
Filaments not woolly.
  Fruit a 2-celled capsule. . . . . Hyoscyamus, 570
  Fruit 4 nucules : style arising from their midst . . . . . . Echium, 550

*** *Corolla nearly or quite regular.*

† *Stamens as many as corolla-lobes.*

Ovaries 2, united by styles or stigmas in flower, separate in fruit.
  Filaments separate : pollen granular. . . . . APOCYNACEÆ, 521
  Filaments usually 1-adelphous : anthers adherent to stigma ; pollen in masses. . . . . ASCLEPIADEÆ, 523
Ovary 1, divided into 4 lobes around the style. . . . . . . BORRAGINEÆ, 529
Ovary 1, not divided or lobed.
  1-celled : fruit a pod or capsuled. . . . . MIMOSEÆ, 211
    Style 1, stigma 1 : fruit a pod.
    Style 1, stigmatose on 2 lines : pyxis incompletely 4-celled. . . Plantago, 667
    Styles, stigmas, or parietal placentæ 2. . . . . GENTIANEÆ, 528
    Styles 0 : stigmas 2-lobed : fruit a small drupe. . . . . SALVADORACEÆ, 521
  2-10-celled, style 1 : partitions sometimes not found in fruit.
    Stamens distinct from corolla or nearly so. . . . . LINEÆ, 181
    Stamens inserted on corolla.
      4 : corolla scarious : capsule imperfectly 4-celled. . . . . Plantago, 667

5, and occasionally more : capsule 2-celled. Page
Ovules numerous in each cell.
Æstivation imbricated : filaments woolly. . . . . . Verbascum, 573
Æstivation wrinkled, valvate, twisted or induplicate, rarely imbricated. . . . . SOLANACEÆ, 565
Ovules and seeds 1-3 in each cell.
Style short : drupe 4-celled, or nutlets 2-4. . . . . . BORRAGINEÆ, 529
Style long : flowers showy : capsule 2-4-valved. . . . CONVULVULACEÆ, 556

† † *Stamens fewer than corolla lobes.*

Stamens 4, didynamous.
Ovary 2-celled : cells ∞-seeded. . . . . Celsia, 581
Ovary 2-4-celled : cells 1-seeded. . . . . VERBENACEÆ, 609
Stamens 2, rarely 3 : ovary 2-celled.
Herbs or small shrubs : corolla rotate, slightly bilabiate . . VERONICEÆ, 572
Shrubs or trees.
Corolla-lobes 4-6, valvate in bud : seeds pendulous . . . . OLEACEÆ, 519
Corolla-lobes 5-8, involute in bud: seeds basilar, erect . . . JASMINEÆ, 518

DIVISION III. APETALÆ (MONOCHLAMYDÆ), sometimes destitute of both kinds of floral envelopes (ACHLAMYDÆ)

A. *Flowers inserted on the lining of a hollow torus.*

Tree, with palmate leaves and milky juice : fruit a fig . . . . . . Ficus, 729

B. *Flowers not inserted in a hollow torus, nor on aments.*

1. *Ovary or its cells ∞-ovuled.*

Ovary adherent to calyx.
Stamens 9-11 : herbs with pinnate leaves and racemed flowers . . . , Datisca, 325
Anthers 6 : non-parasitic herbs, with lurid, curved flowers . ARISTOLOCHIACEÆ, 706
Anthers numerous : parasites : flowers white or yellow . . . CYTINACEÆ, 705
Ovary free, but sometimes enclosed in calyx.
Flowers subtended by 2, scarious bracteoles . . . . Trianthema, 327
Flowers destitute of scaly or colored bracts.
Herbs.
With fleshy leaves : flowers solitary in axils . . . . Aizoon, 327
With awl-shaped leaves : flowers solitary . . . . Sagina, 148
With awl-shaped leaves : flowers capitate . . . . Queria, 152
With round to obovate, spathulate or elliptical leaves . . . MOLLUGINEÆ, 164
Desert shrubs : fruit a 3-celled, berry-like capsule . . . . . Ochradenus, 111
Trees : flowers diœcious, racemed on year-old branches .. . . . Ceratonia, 297

2. *Ovary or its cells* 1-4-*ovuled.*

* *Pistils more than* 1, *separate or nearly so.*

Stamens inserted on the calyx : leaves stipulate . . . . . . Alchemilla, 306
Stamens inserted on the torus : leaves exstipulate . . . . RANUNCULACEÆ, 34

* * *Pistil* 1, *simple or compound.*

Ovary inferior in perfect or pistillate flowers.
Aquatic herbs with opposite, dentate leaves . . . . Callitriche, 318
Herbs with tender stems and leaves : stipulate . . . . CYNOCRAMBEÆ, 733
Annual, diœcious herbs : exstipulate . . . . Spinacia, 680
Herbaceous parasites : flowers spiked, polygamous. . . BALANOPHORACEÆ, 714
Woody parasites . . . . LORANTHACEÆ, 71
Shrubs or herbs, exstipulate . . . . SANTALACEÆ, 712
Ovary adherent to calyx by its lower part only.
Exstipulate . . . . CHENOPODIACEÆ, 676
Stipulate . . . . Sclerocephalus, 162
Ovary free, but included in calyx-tube,
Shrubs or small trees with scurfy leaves . . . . ELEAGNACEÆ, 710
Herbs : calyx colored : leaves simple, opposite . . . . . . NYCTAGINEÆ, 672
Small herbs with green calyx . . . . Aizoon, 327
Ovary free from calyx : calyx sometimes 0,
Stipules sheathing.
Monœcious shrubs or small trees : leaves palmate . . . . . . Ricinus, 727
Herbs or shrubs : flowers perfect : fruit a nutlet . . . . POLYGONACEÆ, 695

Stipules not sheathing.
Herbs with watery juice. Page
Ovary 5-celled . . . . Seetzenia, 186
Ovary 1-celled.
Style or stigma 1; flowers with bracts or 0; leaves simple . URTICACEÆ, 728
Styles or stigmas 2-3.
Embryo peripheral; leaves undivided . . . . . . PARONYCHIEÆ, 158
Embryo falcate-folded; leaves palmate . . . . . . Cannabis, 731
Desert shrubs; cells of ∞-celled berry 1-seeded . . . . . . Mærua, 110
Shrubs; fruit drupe-like . . . . Rhamnus, 201
Trees; fruit drupe-like . . . . Celtis, 729
Trees; fruit samaroid . . . . Ulmus, 728
Stipules 0.
Aquatics; leaves finely dissected, whorled; cotyledons 4. . CERATOPHYLLEÆ, 745
Fleshy, prostrate herbs; bracteoles 2, scarious , ... Trianthema, 327
Weedy herbs or shrubs, with 2-3 bracts under flowers. . . AMARANTACEÆ, 673
Herbs, shrubs or trees without scaly bracts.
Juice watery.
Fruit a utricle . . . . CHENOPODIACEÆ, 676
Fruit a 5-10-celled berry . . . . PHYTOLACCACEÆ, 694
Fruit a 1-celled, indehiscent berry . . . . . . Daphne, 708
Fruit a 3-2-celled capsule . . . . EUPHORBIACEÆ, 715
Fruit a double samara; styles 2 . . . . Acer, 204
Fruit a simple samara; style 1 . . . . Fraxinus, 519
Fruit a dry drupe; leaves pinnate . . . . . . Pistacia, 206
Fruit a drupe; leaves entire . . . . Laurus, 708
Fruit a dry nutlet . . . . Thymelæa, Lygia, 709
Juice milky; flowers monœcious in a common involucre . . Euphorbia, 716

C. *Flowers monœcious; one or both kinds in aments or heads.*

Fertile flowers in an ament; staminate racemed . . . . . . Humulus, 730
Fertile flowers solitary or clustered; staminate in aments.
Leaves pinnate; fertile flowers and fruit naked . . . . . JUGLANDACEÆ, 734
Leaves simple; fertile flowers 1-3 in a cluster, each in a cupule . . Quercus, 737
Fertile flowers in an urn-shaped involucre; staminate in globular aments . Fagus, 741
Fertile and staminate flowers in aments or heads.
Ovary and follicle 1-celled, ∞-seeded; seeds tasseled . . . . . SALICINEÆ, 741
Ovary 1-2-celled; cells 1-seeded.
Parasitic on trees . . . . LORANTHACEÆ, 711
Non-parasitic shrubs or trees.
Calyx regular, conspicuous in fertile flowers, fleshy in fruit . . . Morus, 729
Calyx 0, or rudimentary and scaly.
Style 1, stigma 1; flowers in globular heads . . . . . PLATANACEÆ, 734
Styles or long stigmas 2.
Fertile flowers 2-3 above bract; nucules naked . . . . BETULACEÆ, 735
Fertile flowers 1-2 above bract, each with an involucre. . CUPULIFERÆ, 736

SUBCLASS II. GYMNOSPERMÆ. POLYCOTYLEDONS. Pistil an open bract or altered leaf, bearing two ovules on its edge or upper surface; flowers monœcious or diœcious.

Shrubs, usually climbing; leaves brittle; fruit drupe-like. . . . GNETACEÆ, 746
Shrubs or trees: leaves awl-shaped or needle-shaped . . . . . CONIFERÆ, 746

CLASS II. ENDOGENÆ. MONOCOTYLEDONS. The stem composed of bundles of fibres and vessels not arranged in layers, in Grasses often hollow. Veins of leaves usually parallel, rarely netted. Floral envelopes usually in 3's or 6's.

DIVISION I. PETALÆ. Flowers with perigonium.

1. *Ovary inferior.*

Flowers diœcious or polygamous, regular.
Aquatics, ovules and seeds numerous . . . . HYDROCHARITACEÆ, 752
Terrestrial climbers; ovules 1-3 in cells; leaves vein-netted. . DIOSCOREACEÆ, 777
Flowers perfect, ovules and seeds generally numerous.
Stamens bearing anthers usually 1-2, gynandrous, bilabiate . . ORCHIDEÆ, 753
Stamens 3; anthers extrorse; roots bulbous, cormous, or fibrous . . IRIDEÆ, 766

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Stamens 6; anthers extrorse; bulbous plants . . . . . . AMARYLLIDEÆ, 774

2. *Ovary superior.*

* *Divisions of perigonium* 6, *rarely* 4, *nearly alike in form and color.*

Perigonium glume-like . . . . JUNCACEÆ, 810
Perigonium petal-like.
Trees with flowers on branched spadix, in spathe . . . . . . PALMEÆ, 812
Climbing shrubs; flowers diœcious (rarely perfect); stigmas 3 . . SMILACEÆ, 778
Herbs or shrubs, flowers perfect, monœcious or polygamous; styles 1-3 ASPARAGACEÆ, 779
Cormous herbs; flowers showy on scapes; capsule septicidal . . COLCHICEÆ, 782
Herbs with tuberous, woody, or fibrous roots, or bulbs or rhizomes; capsule loculicidal . . . . LILIACEÆ, 781

* * *Divisions of perigonium of 2 sorts, herbaceous or scarious sepals and colored petals.*

Glumaceous bracts 0; pistils ∞, separate; stamens 6-8 . . . ALISMACEÆ, 820

DIVISION II. APETALÆ. Perigonium absent or reduced to scales.

1. *Spadiceous.*

Aquatics, immersed, with jointed stems and small flowers . . . NAIADACEÆ, 822
Aquatics, not immersed; flowers spiked or capitate . . . . . . TYPHACEÆ, 814
Terrestrials; leaves usually netted-veined; fleshy spadix in spathe . . AROIDEÆ, 815

2. *Glumaceous. Flowers in spikelets, each flower subtended by one or two glumelike bracts.*

1 bract to each floweret; sheaths closed; stem usually solid . . CYPERACEÆ, 827
2 bracts (pales) to each floweret; the spikelet enclosed in 2 glumes; sheaths split; stem usually hollow . . . . . . GRAMINEÆ, 838

3. *Aquatics, not spadiceous, nor glumaceous.*

Minute, stemless, floating, leaf-like plants; flowers from edge or upper surface of frond . . . . LEMNACEÆ, 819
Plants with distinct stems and leaves; flowers axillary . . . NAIADACEÆ, 822

SERIES II. CRYPTOGAMIA or Flowerless Plants. ACOTYLEDONS.

CLASS III. ACROGENÆ. Plants with a stem containing woody tissue and vessels; leaves when existing veined.

Spores-cases on under-surface of leaves, which are sometimes rolled up into false cells . . . . FILICES, 905
Spore-cases under shield-shaped, stalked scales of a terminal spike or cone; leaves 0, or a whorl of teeth at joints of stem . . EQUISETACEÆ, 904
Spore-cases in axils of simple leaves or bracts . . . . . . LYCOPODIACEÆ, 911

SIGNS USED IN THIS WORK.

⊙ An annual plant.
② A biennial plant.
♃ A perennial plant.
♄ A shrub.
♄ A tree.

The decimals signify parts of a metre.

The whole numbers signify metres.

A dash - between figures, as 4-5, signifies *to;* between words serves to connect them.

The English names of Genera are in small capitals after the Latin name. The Arabic names of Genera follow the English, in italics.

The English names of Species follow the signs ⊙ etc., in Roman type. The Arabic names follow the signs, or the English names (where they exist), in italics.

CONSPECTUS OF CLASSES, SUB-CLASSES AND DIVISIONS.

FLORA.

SERIES I.

PHÆNOGAMIA or FLOWERING PLANTS.

Plants having true flowers, with stamens and pistils, and producing genuine seeds which contain an embryo.

Class I. EXOGENÆ.

Stems formed of bark, wood, and pith; the wood forming a layer between the other two, and increasing, when the stem continues more than one year, by the addition each year of a layer next to the bark; the bark also growing, from year to year, by a layer on its inner surface. Leaves generally netted-veined. Embryo with a pair of opposite cotyledons, or several in a whorl. Parts of the flowers usually in fours or fives.

Subclass I. ANGIOSPERMÆ. DICOTYLEDONOUS PLANTS.

Pistil consisting of a closed ovary, which contains the ovules, and forms the fruit. Cotyledons only two.

DIVISION I. THALAMIFLORÆ.

Floral envelopes generally double, *i. e.*, consisting of both calyx and corolla. Petals and stamens generally separate, implanted on the receptacle, under the ovary, free from it, and from the calyx. A few genera and species of this division are destitute of petals.

ORDER I. **RANUNCULACEÆ.** (CROWFOOT FAMILY.)

Herbs, or woody vines, with colorless acrid juice, polypetalous, or apetalous, with the calyx often colored like a corolla, hypogynous; the sepals, petals, numerous stamens, and many or few pistils, all distinct, or pistils slightly connected by ovaries.—Flowers regular or irregular. Sepals 3–14. Petals 3-14, generally equal in number to petals, sometimes irregular, or wanting. Stamens separate, indefinite; anthers united to filament. Pistils equal to sepals in number, or indefinite, free or united below, 1–celled. Fruits akenes, or dehiscent follicles, one- to several-seeded.

FIG. 1.

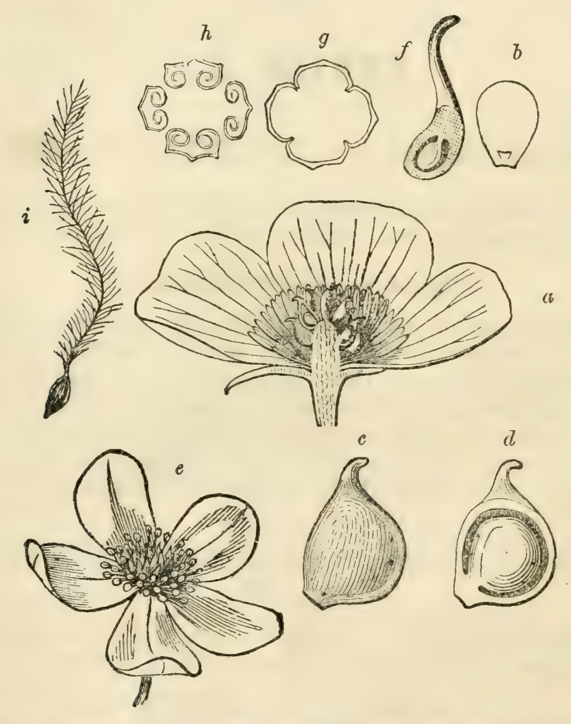


Fig. 1. (*a*) Half flower of Ranunculus, showing the torus on which are inserted the calyx, corolla, stamens, and pistils, all separate from each other: some of the pistils open showing the *erect* seed. (*b*) One of the petals with scale at base, under which nectar is usually found. (*c*) One of the akenes enlarged. (*d*) The same opened showing the *erect* seed. (*e*) Flower of anemone. (*f*) Pistil of same, with ovary split open, showing *pendulous* seed. (*g*) Æstivation, *valvular*, of Clematis. (*h*) *Induplicate* æstivation of another Clematis. (*i*) Akene of Clematis, with its long silky tail.

TRIBE I. **CLEMATIDEÆ.** Sepals valvate or induplicate in bud. Petals wanting.

1. CLEMATIS. Ripe akenes with long feathery tails. Seeds pendulous.

TRIBE II. **ANEMONEÆ.** Sepals imbricated in bud, colored like petals. Petals wanting, or present; pore, if present, at apex of claw. Seeds pendulous

* *Petals wanting. Perennials.*

2. THALICTRUM. Involucre wanting. Akenes grooved lengthwise.
3. ANEMONE. Involucre distant from flower. Akenes not grooved.

* * *Petals destitute of pore. Annuals.*

4. ADONIS. Leaves, radical and stem, ternately divided.

* * * *Petals with pore at summit of claw. Annuals.*

5. MYOSURUS. Leaves all radical, linear, entire.

TRIBE III. **RANUNCULEÆ.** Sepals and petals flattened, imbricated in bud. Petals generally with pore or scale at base. Seeds erect.

6. RANUNCULUS. Akenes destitute of a pair of smooth cells at base.
7. CERATOCEPHALUS. Akenes with a pair of smooth cells at each side of base.

TRIBE IV. **HELLEBOREÆ.** Sepals imbricated in bud. Petals bilabiate or irregular. Fruit a whorl of several seeded follicles.

* *Flowers regular.*

8. HELLEBORUS. Leaves palmate. Sepals petal-like. Petals tubular bilabiate.
9. GARIDELLA. Leaves pinnate. Sepals not petaloid.
10. NIGELLA. Leaves pinnate. Sepals petaloid.

* * *Flowers irregular.*

11. DELPHINIUM. Upper sepal spurred. Petals small in 2 pairs.

TRIBE V. **PÆONIEÆ.** Sepals imbricated in bud. Petals broad. Base of carpels surrounded by a ring. Ovules numerous.

12. PÆONIA. Leaves bi-ternatisect. Flowers large, red.

1. CLEMATIS, L. VIRGIN'S BOWER. 

Sepals 4. Petals wanting. Akenes numerous, sessile, dehiscent, dry. Style with long plumose tail (Fig. 1, *i.*) — Perennial vines climbing by the twisting of the petioles. Leaves opposite.

* *Flowers solitary nodding, with involucre near base.*

1 C. Cirrhosa, L. ♃ حبل مسكي Leaves clustered heart-ovate, coarsely-toothed, *entire, or obscurely lobed.* Involucre cup-shaped, bilabiate, near the flower. Sepals whitish-yellow, ovate—Spring—Hedges from Aintab to southern Palestine. Flowers much larger than in 2 and 3.

* * *Inflorescence paniculate. Base of panicle naked.*

2. C. Flammula, L. ♃ *Leaves when young pubescent, afterwards smooth,* bi-pinnate; segments ovate or oblong entire, or 3-lobed, slightly oblique. Sepals oblong, obtuse, white. Akenes pubescent, with *prominent margin.*—Spring and Summer—Hedges and thickets, common in Syria and Palestine. Flowers 0.016 m. broad.

Var. **maritima,** Boiss. Lobes of leaves linear—With type.

Var. **lobata,** Post. Leaflets broader, coarsely serrate or lobed.

3. C. vitalba, L. ♃ Leaves *pubescent, especially on nerves,* bi-pinnate, divisions ovate-acuminate, *slightly heart-shaped at base,* coarsely toothed, occasionally entire. Sepals white, oblong, woolly on both sides. Carpels hirsute, *margin inconspicuous*—Summer—Hedges and thickets near coast of Syria and Palestine. Flowers 0.01 m. broad.

Var. **Syriaca,** Boiss. Leaflets regularly coarse-toothed. Carpels less convex—Tripoli.

Var. **integrifolia,** Post. Leaflets entire. With type.

2. THALICTRUM, L. MEADOW-RUE.

Flowers without involucre. Sepals 4–5. Petals wanting. Carpels dry, without tails, grooved lengthwise — Perennial herbs with ternately or pinnately decompound leaves, and small panicled flowers.

1. T. Orientale, Boiss. ♃ Leaves 3 – *ternately* compound ; leaflets obovate. Sepals petaloid, white, *longer than stamens.* Carpels 3 – 6 ; stigma oblong, *straight*—April to June—Clefts of rocks near Ghazîr.

2. T. minus, L. ♃ Leaves 3 – *pinnately* compound ; leaflets ovate or more or less cuneate-obovate, 2–3 – fid or lobed. Panicle pyramidal spreading. Sepals fugacious, *as long as filaments or shorter.* Carpels 3–8 ; stigma short, *obliquely* adherent to carpel.

Var. **nutans,** Regel. Smooth. Leaflets sometimes white beneath, acutely lobed or cut—Early Summer—Shady places. Mt. Cassius, and northward.

3. ANEMONE, L. WINDFLOWER. سَقِرٌ

Involucre distant from flowers, composed of three leaves, more or less dissected. Calyx corolla-like ; sepals 5 to 15. Corolla wanting. Stamens numerous. Carpels numerous, without tails—Perennial herbs with handsome flowers, and ternately parted or dissected leaves.

1. A. Coronaria, L. ♃ شقائق النعمان Root tuberous. Sepals 5-7 *obovate, pubescent without.* Carpels covered with dense wool, ending in a long filiform style. Torus *ovate or oblong* — February to April.

Var. **typica,** Post. Calyx *scarlet, or yellow, or rosecolored.* Sepals broad. Leaves much dissected. Flowers sometimes 0.07 m. broad — Everywhere in Syria and Palestine below sub-alpine regions.

Var. **cærulea,** Post. Leaves as in last. Flowers generally somewhat smaller, *blue.* Sepals obovate-oblong—With type.

Var. **parviflora,** Boiss. Divisions of leaves not much dissected. *Scapes long.* Flowers *small, blue.* Sepals oblong—Rather rare.

Var. **incisa,** Boiss. Leaves as in last. Flowers *medium, blue* – Beirut.

2. A. blanda, Schott et Kotschy. ♃ Root tuberous, oblong, rarely cylindrical. Sepals 9-15, *oblong-linear,* blue, *smooth without.* Carpels pubescent, ending in a short black style ; stigma spherical, black. Torus *hemispherical.* — Spring — From Taurus to Lebanon, 1000 to 2000 m. Flower about 0. 02 m. broad. Leaves ternately decompound.

4. ADONIS, L. Pheasant's Eye.

Flowers destitute of involucre. Sepals 5. Petals 5–15, destitute of nectar-bearing pore. Akenes nearly globular, ending in a hard, beak-like style — Annual herbs, with much dissected leaves, and crimson, orange, or yellow flowers. The distinctive characters of our species ill-defined, and inconstant. Foliage and mode of growth of all alike.

* *Inner face of carpel straight, destitute of tooth.*

1. A. Palæstina, Boiss, ☉ Flower 0.02 m. broad, crimson. Calyx smooth. Petals flattened, obovate. Spike dense, cylindrical. Carpels *dilated at middle, surrounded by a toothed crest;* lower portion tuberculated, wrinkled, upper ending in a *short*, pyramidal, *slightly hooked* beak — Spring — Fields, Palestine.

2. A. Aleppica, Boiss. ☉ Flower 0.02 m. to 0.035 broad. Calyx smooth. Petals flattened, spreading, obovate. Spike cylindrical. Carpels oblong, *wrinkled lengthwise*, tapering to a *straight, sharp beak, channeled at base, equalling them in length* — Spring — Fields, from Cœlesyria to Aleppo, and Aintab, and northward.

3. A. autumnalis, L. ☉ Flower 0.01 m. to 0.014 broad, crimson, orange-colored, or yellow. Calyx smooth. Petals concave, connivent. Spike oblong. Carpels pitted and wrinkled, *ending in a short*, straight beak — Spring — Fields, Syria and Palestine; common.

Fig. 2



Spike of A. autumnalis.

Var. **eriocalycina,** Post. Calyx villous—Common with type. (*A. eriocalycina, Boiss.*)

* * *Inner face of carpel furnished with a tooth.*

4. A. æstivalis, L. ☉ Flower 0.015 m. to 0.02 broad. Calyx smooth. Petals flattened, elliptical. Spike dense, oblong, or cylindrical. Carpels *oblong-pyramidal*, pitted, *surrounded at base by a toothed crest* with short exterior spur. Beak ascending; tooth distant from its base—Spring—Fields, northern Syria.

Var. **squarrosa,** Boiss. Spike short. Base of carpel rectangular. Crest acute. Tooth *prominent, nearly as long as beak*—With type.

Var. **longirostra,** Post. Beak of same length as carpel, grooved—Aintab. Ba'albek.

5. A. microcarpa, D.C. ☉ Flower about 0.01 m. broad. Petals flattened, elliptical. Spike dense, oblong. Carpels *small*, pitted, oblong, ending in an ascending beak. Tooth *short, obtuse*, at base of beak—Spring—Aleppo to Moab. Above Jericho. Too near *A. autumnalis.*

6. A. dentata, Del. ☉ *Dwarf.* Flower 0.01 m. broad, or less, *yellow or orange-coloured.* Calyx smooth. Petals connivent obovate. Spike dense, cylindrical. Carpels *reticulate*, wrinkled, surrounded near the middle by a toothed crest, *from the outer aspect of which projects a spur as long as beak.* Beak ascending, blackish. Tooth near the base of beak, thick—Spring—Aleppo and Palmyra to Hamath. Gaza, and southward in the Tih.

Var. **subinermis,** Boiss. Flowers smaller. Spike more compact. Crest of carpels less prominent — Damascus. Borders of et Tih.

7. A. flammea, Jacq. ⊙ Stem stout. Flower 0.015 m. to 0.02 broad. Calyx appressed-hairy. Petals *linear-elliptical,* flattened. Spike cylindrical loose. Carpels ovate, ending in an ascending, black beak. Tooth *obtuse, near base of beak*—Spring—Fields, throughout ; rather rare. Too near *A. æstivalis.*

5. MYOSURUS, L. Mouse-Tail.

Flowers destitute of involucre. Sepals 5, furnished with a spur at base. Petals 5, with filiform claw, and nectar-bearing pore at base of lamina. Akenes wedge-shaped. Style beak-like, short—Small annual herbs, with undivided leaves.

M. minimus, L. ⊙ All the leaves clustered at the root, linear. Scape 1-flowered. Petals shorter than calyx. Carpels crowded on a tapering spike— Spring—Above Zebedani. El-Balqa

6. RANUNCULUS, L. Crowfoot. Buttercup. شقيق

Sepals 3–5. Petals 5, rarely more, with pore at base, naked, or covered with a scale. Akenes numerous, usually flattened, apiculate —Annual or perennial herbs.

§ **1. BATRACHIUM.** ♃ *Petals white, furnished with a naked pore at base. Aquatic perennials, with floating or immersed leaves.*

1. R. aquatilis, L. ♃ Flowers 0.01 m. to 0.02 broad. Peduncles *as long as, or longer than, leaves.* Petals obovate, *broad.* Stamens *numerous*—Spring.

Var. **heterophyllus,** D.C. *The floating leaves round, with wedge shaped, crenate lobes.* The immersed leaves capillary, much dissected —Hums.

Var. **submersus,** Gr. et Godr. *All the leaves immersed,* with elongated *capillary* lobes,—Canals and streams ; common.

Var. **sphærospermus,** Boiss. Sepals ¼ to ⅓ as long as petals. All the leaves immersed, with *short and stiff lobes.* Carpels nearly globular, scarcely keeled—Common.

Var. **pantothrix,** Bl. Leaves much dissected, lobes long, slender—Common, with *var. submersus.*

2. R. trichophyllus, Chaix. ♃ Flowers less than 0.01 m. broad. Peduncles usually shorter than leaves, sometimes longer. Petals usually narrow, sometimes broad, *less than twice as long* as sepals. *Stamens few.*—Spring—Aintab to Galilee, and southward. A species with much dissected leaves, and capillary lobes, too near to *var. pantothrix* of last.

§ **2. FICARIA,** ♃ *Petals* 8–12, *yellow. Pore at base of petals covered with a scale.*

3. R. Calthæfolius, Jord. ♃ صاري جيكي Leaves ovate-cordate *entire or pinnate, or obscurely toothed.* Peduncles as long as, or longer than, leaves. Sepals yellowish-white. Corolla 0.02 *m. to* 0.03 *broad.*

Carpels ovate, *hirsute*—February to April—Wet places, from Aintab to Jerusalem.

4. R. ficarioides, Bory et Chaub. ♃ Dwarf. Leaves small ovate-cordate, *with obtuse, crenate lobes.* Peduncles shorter than leaves. Sepals yellow. Corolla *about* 0.01 *m. broad.* Carpels oblong, *smooth*—March to May—Lebanon, from 500 m. to 1,500.

§ **3. EURANUNCULUS.** ⊙ or ♃. *Sepals* 5. *Petals generally yellow, sometimes scarlet, or crimson, or orange-colored, or white. Pore at base of petals generally covered with a scale.*

Series I. Perennials.

* *Divisions of root grumous.*

† *Carpels nearly spherical. Alpine plants.*

5. R. myosuroides, Boiss. et Ky. ♃ Dwarf (0.02 to 0.06 m..) glabrescent. Root-leaves 1–2 or more, *with* 3–5 *oblong, entire, or bifid lobes;* stem-leaves 3-parted, or wanting. Flowers 0.007 *m. broad*; petals elliptical, somewhat longer than sepals. Spike oblong. Carpels smooth, oblong. Style shorter than ovary, straight—May to July—Alpine regions of Lebanon and Antilebanon.

† † *Carpels flattened.*

‡ *Root-leaves, or all but the lowest, palmately lobed or cut.*

a. *Flowers large, red, or rose-colored, or orange, or yellow, or white.*

6. R. Asiaticus, L. ♃ شقائق النعمان Appressed hairy. Lower leaves round, crenate; the others more or less dissected, with oblong, toothed lobes. Flowers 1-5. Corolla 0.02 *m. to* 0.06 *broad, crimson, or rose-colored, or orange,* or yellow, *or white.* Spike 0.02 m., or more in length, dense. Carpels papyraceous. Beak reflexed, shorter than ovary — February to May — Fields, and waste places, Syria and Palestine. Notwithstanding its brilliant flowers, not to be regarded as the "*lily of the field.*"

Var. **tenuilobus,** Boiss. Leaves much dissected—With type.

b. *Flowers medium-sized, yellow, or whitish.*

7. R. Sprunerianus, Boiss. ♃ Hirsute. Stem *stout*, 0.04 m. high, *much branched.* Root-leaves round, with heart-shaped base, and *three obtusely lobed divisions.* Spike oblong. Carpels *triangular-pyramidal, beset with hairs with a tubercled base.* Beak as long as ovary, *straight*, or slightly curved, hooked at extremity—May to July—Subalpine regions of Lebanon and Antilebanon, El-Buqa'.

8. R. Damascenus, Boiss. et Gaill. ♃. Stem and indument as in last. Root-leaves as in last, with *numerous, overlapping*, obtuse lobes. Lobes of stem-leaves *oblong, obtuse.* Spike ovate, at length oblong. Beak *curved*—Spring—Fields, Aintab to Damascus, and the Buka'. This and the last are probably varieties of R. oxyspermus, M.B.

9. R. cuneatus, Boiss. ♃ Villous. Stem *slender*, 0.25 m. high, *with few branches.* Root leaves round-ovate, with wedge-shaped, or rounded, or heart-shaped base; *lobes not over-lapping.* Lobes of stem-leaves linear, acutish. Spike ovate. Beak *straight*—Summer —Alpine regions of Lebanon.

10. R. Chærophyllos, L. ♃ Appressed-silky-hairy. *Neck covered with dense fibres.* Lower root-leaves nearly round, 3-lobed, dentate ; the remainder dissected into oblong or linear lobes. *Stem* 1–3 *flowered.* Spike ovate-oblong. Carpels ovate, *punctate*, ending in a spreading, recurved beak—Spring—Aleppo, Antilebanon, and Lebanon, below 1,000 m., to coast.

‡ ‡ *Root leaves pinnately parted.*

11. R. millefoliatus, Vahl. ♃ *Glabrescent.* Leaves 2–3-pinnately parted, lobes oblong, or linear, acute. *Stem simple,* 1–2 *flowered.* Spike oblong. Carpels nearly spherical. Beak *recurved,* half as long as ovary—Spring—Abeih at el Hadhîrah, and probably elsewhere in Lebanon.

12. R. myriophyllus, Russ. ♃ ثبرة *Canescent with appressed wool.* Leaves pinnately *dissected ;* lobes oblong, somewhat acute. Stem *divaricately much branched.* Fruiting peduncles long. Spike oblong. Carpels triangular-obpyramidal, punctate, smooth, ending in *a slightly spreading* beak, shorter than ovary—Spring—Fields, Syria and Palestine.

Var. **Hierosolymitanus,** Post. Lobes of leaves linear. Flowers whitish, often 0.02 m. or more in breadth. Fruiting peduncles thickened. Beak shorter than in type — With type throughout. (*R. Hierosolymitanus, Boiss.*)

* * *Divisions of root fibrous.*

† *Rachis hairy.*

13. R. palustris, L. ♃ Rootstock short. Hair of stems and petioles short, dense ; of leaves appressed-villous. Root-leaves ovate, ternately parted ; divisions cut-lobed, *obtusely* toothed. Peduncles grooved. Carpels *ovate,* ending in a short, straight beak—Spring—Wet places near Aleppo.

14. R. Neapolitanus, Ten. ♃ Upper portion of stems appressed hairy. Rootstock short, with thickened fibres. Lower leaves round-ovate, ternately parted ; divisions cut-lobed, *acutely toothed.* Peduncles slender, grooved. Carpels *round,* ending in a short, conical beak—End of Spring—From Lebanon to Aintab, and northward.

15. R. chionophilus, Boiss. ♃ Smooth, dwarf, tufted. Neck thickened, with *fibrous roots.* Root-leaves oblong, 2–3-*pinnately parted,* with oblong lobes. Scapes *not longer than leaves,* 1–2 flowered. *Sepals smooth.* Carpels ovate, *margin thickened* ; disk tubercled ; beak not hooked—Summer—Alpine regions of Lebanon and Antilebanon.

16. R. demissus, D.C. ♃. Dwarf. *Rootstock oblique.* Neck *clothed with fibres,* furnished with whitish hairs. Root-leaves smooth, round, *palmately divided* into 3–5 segments, which are dissected into oblong lobes. *Scapes longer than leaves,* 1-flowered. *Sepals pubescent.* Carpels triangular-ovate, flattened ; *margin not thickened ;* beak *hooked* —Summer—Alpine regions of Lebanon and Antilebanon.

† † *Rachis smooth. Inflorescence corymbose, loose.*

17. R. Cassius, Boiss. ♃ Appressed-silky-hairy. *Root-stock horizontal, with descending fibres, and short terminal suckers.* Radical leaves pentagonal, ternate, the middle segment petiolulate, and all the

segments divided into oblong-cuneate cut lobes. Carpels ovate, *punctate*, slightly hairy, marginate, *tapering* into a short *straight* beak —May and June—Lebanon and Antilebanon, and northward.

18. R. Constantinopolitanus, Urv. ♃ Villous below, appressed-hairy above. Root-fibres descending *directly from neck.* Root-leaves triangular-ovate, ternate, with obovate, cut, and coarsely toothed lobes. Carpels large, ovate, *striate*, smooth, *ending abruptly* in a *very short, hooked* beak—April to June—

Var. **Palæstinus,** Boiss. Lobes of leaves cuneate at base—Hedges, Aintab to Antilebanon and Lebanon. Plain of el Huleh.

Series 2. Annuals.

* *Carpels not margined. Petals destitute of scale at base.*

19. R. sceleratus, L. ⊙ Stem erect, often thickened. Lower leaves 3-parted, with oblong or cuneate, lobed or cut divisions. Carpels in ovate heads 0.002 m. to 0.004 long, minute, obovate, with grooved border, and short, *mucronate* beak—Spring—Wet places from Hamath to Tripoli, and probably elsewhere.

* * *Carpels more or less flattened, margined, generally tubercled or prickly. Petals with scale at base.*

† *Leaves undivided.*

20. R. ophioglossifolius, Vill. ⊙ Glabrescent. Stem fistulous, erect. Lower leaves *ovate* or *ovate-cordate*, upper *oblong-lanceolate.* Flowers about 0.005 m. to 0.007 broad. Heads as in last. Carpels as large as mustard seeds, ovate, slightly flattened; margin narrow, beak *short, black*, hooked—Spring—Wet places near Tripoli, and probably elsewhere.

21. R. lateriflorus, D.C. ⊙ Glabrous. Stem erect, fistulous. Leaves *oblong-elliptical.* Flowers small, sessile in axils, or terminal. Heads round-ovate; carpels ovate, with tubercled disk, and acute margin. Beak *nearly as long as ovary*, lanceolate, hooked—Spring—Syria. Moab.

† † *Leaves palmately divided, cut or lobed, sometimes much dissected.*

22. R. Chius, D.C. ⊙ Villous or glabrescent. Stem much branched. Leaves round-heart-shaped, with three crenately-lobed divisions. Peduncles opposite leaves, *thickened in fruit.* Flowers 0.004 m. broad. Petals as long as sepals. Heads globular 0.005 m. broad. Disk of carpels studded with tubercles, *ending in a hooked hair.* Margin acute, not grooved, tapering to a hooked beak, *half as long as ovary*—Spring—Coast of Syria, and Lebanon.

23. R. philonotis, Retz. ⊙ Hirsute. Lower leaves ovate-cordate, sometimes broader than long, crenate-toothed or lobed. The rest 3-parted, with cut and toothed divisions. Flowers 0.01 m. broad. Petals *twice as long as sepals.* Heads ovate, 0.004 m. broad. Carpels *nearly round;* disk tubercled *near the 2-grooved margin; beak very short, obtuse*—Spring—Aintab to Aleppo.

24. R. trachycarpus, F. et M. ⊙ Hirsute. Root-leaves round, crenate, 3-parted or cut. The remainder trifid, with lobed

segments. Petals a little longer than sepals. Heads spherical, *about 0.005 m. in diameter.* Carpels *ovate;* margin 2-grooved, disk *tubercled,* beak *tapering,* half as long as ovary—Spring—Wet places from Hums to Kerak.

25. R. lomatocarpus, F. et M. ⊙ Glabrescent. Leaves ternate; divisions obovate, those of lower leaves obtusely lobed and cut, of upper leaves dissected into oblong and linear, acute lobes. Petals twice as long as sepals. *Head* 0.01 *m. or more in diameter.* Carpels ovate; disk tubercled; margin with, or without groove, *tapering into a slightly curved beak, half the length of ovary*—Spring — Fields, Syria and Palestine; common. Leaves often much dissected into narrowly linear lobes.

FIG. 3



Head of R. lomatocarpus, var. cornutus.

Var. **cornutus,** Post. *Beak as long as ovary*—With type—(*R. cornutus D.C.*)

26. R. muricatus, L. ⊙ Glabrous or glabrescent. Root-leaves long-petioled, *round or kidney-shaped,* with 3 cut and toothed divisions. Upper leaves cuneate at base, *with* 3 *oblong, cut or toothed divisions.* Petals a little longer than sepals. Heads generally more than 0.01 m. in diameter. Carpels large, ovate, with *muricate disk, and strongly grooved margin,* tapering abruptly into a beak as long as ovary—Spring—Ditches and wet places; common throughout.

27. R. arvensis, L. ⊙ Glabrous or slightly-hairy. Lower leaves cuneate-obovate, cut or toothed, or 3-parted; the remainder ternate, dissected into linear lobes. Carpels 0.006 m. long, obovate; disk muricate; margin at *right angles to surfaces of disk, broad, fringed at both edges with stiff spines much larger than those of the disk;* beak usually 0—Spring—Fields common.

Var. **rostratus,** Post. Spines of disk shorter, sometimes reduced to tubercles; spines of margin short, often mere teeth. Carpels ending in an oblique, slender, curved beak, more than half as long as ovary—Lebanon. Bethel.

Var. **longispinus,** Post. Spines of margin longer than ovary—Minat el Husn, Beirût.

28. R. Pinardi, Boiss. ⊙ Dwarf, appressed-hirsute. Lower leaves round-wedge-shaped, obtusely 2–3-toothed; the rest dissected into linear-oblong lobes. Carpels few, 0.01 m. long, 0.003 broad; disk minutely tubercled; margin tumid, obtuse, tapering into a lanceolate, circinnate beak twice as long as ovary—Summer—Anti-lebanon, above Rasheiya and Zebedâni.

7. CERATOCEPHALUS, MŒNCH.

Sepals 5. Petals 5, with nectar-bearing pore at base, covered with a scale. Akenes caducous, with an empty cell at each side of base. Beak long, sickle-shaped—Dwarf annual herbs, with palmate leaves, dissected into linear lobes.

C. falcatus, Pers. ⊙ Beak curved upward, hooked—Spring—Fields, Syria.

Fig. 4



Head of Ceratocephalus falcatus, var. vulgaris.

Var. **vulgaris,** Boiss. Scape as long as, or longer than leaves. Beak broad at base.

Var. **exscapus,** Boiss. Canescent, or rufescent. Scapes short or 0

Var. **incurvus,** Boiss. Scapes longer than leaves. Base of beak narrow.

8. HELLEBORUS, L. Hellebore. خَرْبَق

Sepals 5, petaloid, persistent. Petals small, tubular, bilabiate. Carpels united at base—Perennial herbs, with palmate or pedate leaves, and greenish, lurid, nodding flowers.

H. vesicarius, Auch, ♃ 0.3 m. to 0.5 high. Root-leaves long-petioled, ternate, with petiolulate segments, dissected into cuneate cut-toothed lobes. Floral leaves sessile, with 3–5 oblong-cuneate, cut-toothed lobes, overtopping the flowers. Carpels inflated, forming a light green, spherical capsule, 0.04 m. or more in diameter—February to May—Woods, Mt. Cassius and northward.

9. GARIDELLA, Tourn.

Sepals 5, caducous, not petaloid, shorter than petals. Petals 5, with a long claw, having a nectar-bearing pore at its apex, and a bilabiate limb ; both lips bifid, the outer much longer than the inner. Fruit a 2–3–celled capsule—Annual, erect, rigid herbs, with pinnate leaves dissected into linear or capillary lobes.

G. unguicularis, Lam. ⊙ Claws twice as long as sepals and laminæ, or longer. Laminæ wavy-margined. Capsule 0.005 m. to 0.01 broad, composed of two or three follicles, united for two thirds of their length—Spring—Fields, Syria and Palestine.

10. NIGELLA, L. Fitch. Fennel-Flower. شونيز . شهنيز

Sepals 5, petaloid, caducous, longer than petals. Petals small, clawed, with bilabiate lamina, the outer lip cleft into two or more lobes, and the inner smaller, entire or bifid. Nectar-pore at base of outer lip. Fruit composed of 5-12, more or less united follicles. Style long, beak-like—Annual herbs with leaves, 1–3–pinnately dissected into linear or capillary lobes.

* *Flowers bluish. Carpels not compressed. Inner lip of petals half, or more than half as long as outer.*

1. N. arvensis, L. ⊙ Leaves simple, or 1–2–pinnately divided. Claw short. Inner lip of petal half as long as outer, Carpels 3–5, strongly 3–ribbed *adherent for two thirds of their length,* forming an obconical capsule ; *beak as long as ovary, or a little shorter*—Spring—

Var. **glauca,** Boiss. Glaucescent. Lobes of leaves *long, acute* —Maritime plain of Syria.

Var. **divaricata,** Boiss. Glaucous. Lobes of leaves *short, obtuse.* Upper leaves sometimes simple — Syria and Palestine. Alexandria.

Var. **caudata,** Boiss. Carpels united to their middle only—Vineyards and fields near Aintab.

2. N. deserti, Boiss. ⊙ 0.02 m. to 0.04 in height. Flowers small. Petals short-clawed ; inner lip nearly as long as outer. Carpels 3, *adherent for one third of their length*, 3-nerved below, 5-nerved above ; *beak a little longer than ovary*—Spring—From El Balqa to the Tih, and southward.

3. N. stellaris, Boiss. ⊙ Flowers medium-sized. Petals long-clawed ; inner lip about half as long as outer. Carpels 5, lanceolate, keeled, *adherent for one fourth of their length*, 1-nerved ; *beak twice or three times as long as ovary*—Spring—Fields, Kessab ; Lattakia.

4. N. sativa, L. ⊙ Nutmeg-Flower. الحبة السوداء . حبة البركة Flowers large. Petals short-clawed ; inner lip nearly as long as outer. Carpels 5-7, inflated, *warty at sides, united to apex ; beak as long as ovary*—Spring—Fields, Egypt. *The black seeds of this species are sprinked over some kinds of bread in the East.*

Var. **brachyloba,** Boiss. Densely branched, hirsute. Capsule very warty—Aintâb and westward.

* * *Flowers yellowish-white. Inner lip of petals very short. Carpels flattened.*

5. N. Orientalis, L. ⊙ Lobes of leaves rigid. Sepals glabrous. Petals short-clawed ; *exterior lobe ovate, short-bifid.* Carpels united for half their length ; *nerves three, distant, connected by transverse veins*—May—Amanus and eastward.

6. N. oxypetala, Boiss. ⊙ Lobes of upper leaves often oblong-lanceolate. Sepals glabrous. Petals minute, clawed ; external lip broader than long, *somewhat 4-lobed*, lateral lobes short, round ; *intermediate lobes dissected into bristles longer than stamens.* Carpels *united beyond middle ;* nerves 3, approximate—May—Fields, Aintab to Aleppo.

Var. **Nocana,** Boiss. Petals long-clawed—Bludan.

Var. **tenuifolia,** Boiss. Lobes of leaves slender. Petals long-clawed—Aintab.

7. N. ciliaris, D.C. ⊙ Sepals hispid. Petals clawed ; outer lip cuneate, bifid, with long, linear, hispid lobes. Carpels 5-15, hispid, adherent for a little more than ½ their length, prominently 3-nerved—April to June—Fields, Syria and Palestine.

11. DELPHINIUM, L. LARKSPUR. عائق

Sepals 5, irregular, petaloid, the uppermost spurred or helmet shaped. Petals generally 4, the upper two prolonged into spurs, which are included in the spurs of the calyx, and all separate, or united into a monopetalous spurred corolla. Follicles 1-5 separate—Annual or perennial herbs.

* *Follicle* 1. *Petals united.*

† *Petal* 3-*lobed.*

‡ *Peduncle nearly* 0. *Floral leaves longer than flower, much dissected.*

1. D. axilliflorum, D.C. ⊙ Glabrescent, or puberulent above. Sepals ovate-oblong. Upper lobe of petal oblong, bifid, *as long as ovate, lateral lobes.* Follicle glabrescent, or appressed-pubescent, cylindrical, obliquely wrinkled, *nearly sessile, appressed to stem* — May and June — Cœlesyria, Lattakia and northward. *Flowers violet, or bluish-white.*

‡ ‡ *Peduncle as long as, or longer than follicle. Floral leaves simple or nearly so.*

2. D. Orientale, J. Gay. ⊙ Sparingly pubescent. Racemes *long, dense.* Sepals round-ovate and ovate. Upper lobe of petal oblong, bifid, *much longer than the triangular, obtuse, lateral lobes.* Spur shorter than petal. Fruiting peduncles curved upward, longest near base of raceme. Follicles sparsely glandular, cylindrical, *abruptly mucronate.* — April to June — Damascus to Aintab and Marash, and northward. *Flowers deep violet or purple, retaining their color for a long time when dry. Flowers of this species have been found in the garlands of mummies* 3,000 *years old, with color but slightly faded.*

3. D. tomentosum, Auch. ⊙ Appressed-canescent, branching from base. Racemes *short, loose.* Sepals ovate, and ovate-oblong. Petal triangular, *with scarcely distinguishable lateral lobes.* Spur *a little longer* than petal. Fruiting peduncle erect, *refracted at insertion of long bracts.* Follicle appressed-hairy, cylindrical, *tapering* into a beak one-third its length — Spring — Waste fields, Aleppo to Aintab, and northward. *Flowers violet to light-blue, and rose-color.*

4. D. oliganthum, Boiss. ⊙ Appressed-canescent, branched from base. Racemes short, *flowers* 1-7 *rose-colored.* Petal cuneate at base, triangular, obscurely 3-lobed. Spur *somewhat shorter* than petal. Calyx and corolla somewhat persistent after flowering. Fruiting peduncle divergent, refracted at insertion of *short* bracts. Follicle woolly, oblong, inflated, *ending abruptly* in a short beak — May and June — Aintab to Palmyra, and Cœlesyria, and eastward.

5. D. sulphureum, Boiss. et Haussk. ⊙ Low, appressed-pubescent, corymbose. Flowers 3-5, in short raceme, *sulphur-colored.* Upper lobe of petal 3-*toothed,* longer and narrower than lateral lobes. Spur *twice as long* as petal. Fruiting peduncle recurved. Follicle pendulous, hirsute with white hairs, oblong-lanceolate, mucronate — Spring — Grassy places in mountains about Marash, 1,300 m.

6. D. pusillum, Labill. ⊙ Dwarf, 0.02 m. to 0.08 high, soft-velvety, canescent. Branches divergent from neck. Racemes dense, with 3-5, *rose-colored* flowers. Petal rhomboid, with 3 *obscure lobes of equal length,* the middle one truncate, 3-toothed. Spur *shorter* than petal. Fruiting peduncle refracted at apex. Follicle oblong, compressed appressed-hairy — June — Lake Yamûni. Lower regions of Antilebanon.

7. D. rigidum, D.C. ⊙ Velvety-canescent, viscid, rigid, much branched from base. Racemes with few, scattered, *white*, or *rose-colored* flowers. Middle lobe of petal *bifid*, *much shorter* than lateral, rounded lobes. Spur *as long as* petal. Fruiting peduncle long, *straight*, or *slightly bent near apex*. Follicle sparingly glandular-hairy, oblong, curved upward, *ending abruptly* in a beak *one-third* to *one-half* its length — April to July — Fields, Syria and Palestine.

8. D. Cappadocicum, Boiss. ⊙ Pubescent with white hairs below, and *golden* hairs *with glandular base above. Lobes of leaves oblong-lanceolate.* Racemes loose ; flowers *violet*. Middle lobe of petal oblong, bifid, *as long as, and narrower* than lateral lobes. Spur *twice as long* as petals. Fruiting peduncles spreading, *recurved*. Follicles sparsely hairy, oblong, *tapering* into a beak *one-fourth* their length — June — Aintab and northward.

† † *Petal obovate, broader than long, truncate, 4-toothed.*

9. D. deserti, Boiss. ⊙ *Dwarf*, puberulent, viscid, dichotomous from base. Leaves *oblong, minute.* Flowers minute, *terminal, yellow*. Spur horizontal, *as long as* petal. Follicle pubescent, oblong, few seeded — Spring — Lesser desert (Barrîyat Ja'far).

† † † *Petal 5-lobed. Calyx spur boat-shaped with a crozier-shaped extremity.*

10. D. anthoroideum, Boiss. ⊙ Appressed-pubescent, dichotomous. Flowers *whitish-rose-colored.* Upper lobe of petal bifid longer than intermediate triangular lobes. Lower lobes ovate, larger than the rest. Follicle oblong, *ending abruptly* in a beak one-fourth its length — Summer — Dry places from middle zone of Antilebanon, Lebanon, and Cœlesyria, to Aintab and northward.

* * *Follicles* 3. *Petals distinct, the upper notched.*

11. D. peregrinum, L. ⊙ More or less pubescent, or glabrous, glaucescent. Branches stiff, *straight*, nearly naked. Lower leaves 3-parted, leaflets cut into linear-lanceolate lobes. Upper leaves entire, linear. Flowers *violet-colored.* Laminæ of lateral petals *a little shorter than, or as long as* claw. Spur straight, ascending, *once and a half to twice* as long as flower. Follicles cylindrical, mucronate or aristate, slightly hairy — June to October — Dry places, Syria and Palestine to 1,500 m. A variable species, including *D. virgatum, Poir*, and perhaps *D. halteratum, Sibth. et Sm.*

Var. **densum.** Pubescent. Racemes long, dense. Calyx sparingly pubescent. Spur 1½ as long as flower.

Var. **laxum.** Puberulent, or glabrous, glaucescent. Racemes loose, few-flowered. Calyx as in last. Spur twice as long as flower. Follicles turgid. (*D. virgatum, Poir*). The commonest variety.

Var. **eriocalyx.** Calyx densely pubescent. Spur 1½ as long as flower. Follicle turgid, somewhat torulose — Beilan.

12. D. Bovei, Decaisme. ⊙ *Dwarf*, glabrous, excepting the appressed-pubescent peduncles. Branches rigid. Lower leaves oblong-spathulate, trifid. Stem leaves linear-lanceolate, acute, undivided.

Racemes *short*, loose. Laminæ of lateral petals *one-half or one-third as long as* claw. Spur ascending, *thrice* as long as flower. Follicles *glabrous*, somewhat divergent — Spring — Lesser desert.

* * * *Follicles* 3-5. *Petals separate, setose, the upper* 2-*lobed.*

13. D. Ithaburense, Boiss. ♃ Sparingly pubescent. Stem tall, angled, simple. Leaves *palmately-parted*, segments cuneate, cut and divided into oblong-linear lobes. Racemes rather dense. Flowers *bluish-white.* Sepals pubescent without; *petals setose. Follicles hirsute*, tapering into a long beak — May and June — Valley to the north of el Jebel el Ahmar, near Antioch. Mt. Tabor.

12. PÆONIA, L. Peony. *Narmishk.*

Sepals 5, persistent, leaf-like, unequal. Petals 5 or more. Follicles 2-5, dehiscent on their inner side — Perennial herbs, with 1-2 ternate leaves, large showy flowers, and fleshy root-stock, bearing tuberous fibres.

P. corallina, Retz. ♃ Leaves bi-ternate, glabrous, rarely puberulent beneath, leaflets distinct, oblong-elliptical, entire. Flowers rose-colored, 0.1 m. broad. Follicles woolly, becoming horizontal — Spring — Woods, Cassius, Amanus, and northward.

Var. **triternata,** Boiss. Leaflets round-ovate, frequently subcordate, obtuse, or slightly acute — Afka. Amanus.

Order II. BERBERIDACEÆ. (Barberry Family.)

Herbs or shrubs, with alternate leaves, with sepals and petals both imbricated in the bud, in two rows. The hypogynous stamens as many as the petals and opposite to them; anthers adnate, opening by two elastic valves at the top. Ovary solitary, 1-*celled.* — Sepals 3-4-6. Petals as many, or twice as many as sepals. Fruit a berry, or an inflated capsule, irregularly torn at maturity.

* *Fruit an inflated capsule. Flowers panicled.*

1. BONGARDIA. Herbs. Leaves all radical. Capsule 0.01 m. long.

2. LEONTICE. Herbs. Stem leafy. Capsule 0.02 m. to 0.03 m. long.

* *Fruit a small berry. Flowers in small, corymbose racemes.*

3. BERBERIS. Shrubs with 3-parted thorns.

1. BONGARDIA, C. A. Mey.

Sepals 3-6, bracts 0. Petal 6, destitute of scale, but furnished with a nectar-bearing pore at base. Stamens 6. Style short; stigma discoid, plicate-lobed. Ovules 5-6, basilar. Fruit an inflated capsule, opening when ripe by an irregular laceration; seeds 1-4, globular — Glabrous herbs, with leaves all radical, and root a large turnip-shaped corm, 0.20 m. or more beneath the surface of the soil.

B. chrysogonum, L. ♃ *'urf-ud-dîk.* — Leaves *pinnatisect*, segments sessile, obovate-cuneate. 3-6 fid at apex, opposite, or in whorls of 4 at the lower part of the leaf. Stem loosely panicled with scales at the base of the branches. Capsule *ovate-oblong*, 0.01 m. long — Early Spring —Fields, Syria and Palestine to 1,000 m. Root used as a remedy for Epilepsy.

Fig. 5.

Fruit of Bongardia chrysogonum, L.

2. LEONTICE, L. Lion's Leaf.

Sepals 6, bracts 0. Petals 6, with a stipitate scale at inner face of base. Stamens 6. Style short, stigma obtuse, indistinct. Ovules 2-4 basilar Capsule inflated, seeds globular — Glabrous herbs, with root as in last, and leafy stem.

L. leontopetalum, L. ♃ *Khamîrat Adhâr. Leaves biternatisect*, leaflets ovate or obovate, rarely subcordate. Inflorescence a large, dense, leafy panicle. Bracts oblong, much shorter than the pedicels. Capsule *round-ovate*, 0.02 m. to 0.03 long — Early Spring — Fields, Syria and Palestine to 1,000 m. Root used as a remedy for Epilepsy.

Var. **oblongifolium,** Post. Leaves 2-3-ternatisect. Leaflets oblong, obtuse, truncate or retuse, cuspidate — Aintab.

3. BERBERIS, L. Barberry. *Berberîs.*

Sepals 6, bracteolate. Petals 6, concave, with two glands at inner aspect of base. Stamens 6. Stigma peltate. Berry with 2-3 subbasilar, erect seeds — Shrubs with 3-5-parted thorns.

B. cretica, L. ℨ Low. Leaves firm, nearly sessile, obovate-elliptical, entire, or slightly serrate, *hardly as long as* 3-parted thorns. Racemes few-flowered, corymbose, shorter than leaves. Berries ellipsoid, *black* — Summer — Lebanon and Antilebanon, above 1,200 m. *B. cratægina, D. C.* is a variety of this species with longer leaves and exserted racemes.

Order III. NYMPHÆACEÆ. (Water-Lily Family.)

Aquatic perennial herbs, with submerged root-stocks, and floating or emersed cordate or peltate leaves, and floating or emersed flowers; the ovules parietal, and the embryo enclosed in a small sac at the end of the albumen, next to the hilum. — Flowers regular, axillary, solitary. Torus fleshy, urn-shaped, enclosing carpels. Sepals 4-5, inserted at base of torus. Petals numerous, inserted in many rows into the torus. Stamens indefinite, in many rows inserted into the torus; anthers adnate. Fruit berry-like consisting of the fleshy torus, enclosing carpels, which adhere to it and one another.

1. NYMPHÆA, L. Water-Lily. Water-Nymph. *Ul-Haudhân.*

Sepals 4, green outside, nearly free. Petals destitute of a nectar-bearing pore, inserted over the whole torus. Stamens inserted on the

fleshy torus which incloses the carpels, the outer petaloid. Carpels 18-20, connate forming a capsuloid berry with a concave summit, having a globular projection in the centre—Flowers white, blue, or rose-color, very showy.

N. alba, L. ♃ White Water-lily. Leaves cordate entire. Sepals obtuse. Petals *white*, ovate, obtuse. Anthers blunt. Stigmas with short, cylindrical appendages — Summer — Hûleh and northward.

2. NUPHAR, Smith. Yellow Pond-Lily. Spatter-Dock.

Sepals 5. Petals stamen-like, or scale-like, with a nectar-bearing pore at back, inserted under the carpels. Carpels connate, in a ring, forming a capsule-like berry — Flowers yellow, not showy.

N. luteum, L. ♃ Common yellow Water-lily. Leaves ovate deeply cordate. Sepals orbiculate, concave. Anthers oblong-linear. Stigma unbilicate, 12-16-rayed, entire, or slightly repand — Summer — In ponds and streams, throughout.

Order IV. PAPAVERACEÆ. (Poppy Family.)

Herbs with milky or colored juice, flowers regular (except Hypecoüm, which has two unequal pairs of opposite petals), with fugacious sepals, polyandrous hypogynous, the ovary 1-celled with two or more parietal placentæ, or a silique, 2-celled by a spongy partition connecting the placentæ, or a loment separated into joints by transverse partitions, or apparently a many-celled capsule, the placentæ nearly reaching the axis. — Petals 4-6. Stamens usually numerous (in Hypecoüm 4). Ovules numerous. Capsule opening by pores or valves. Leaves alternate, exstipulate.

Fig. 6

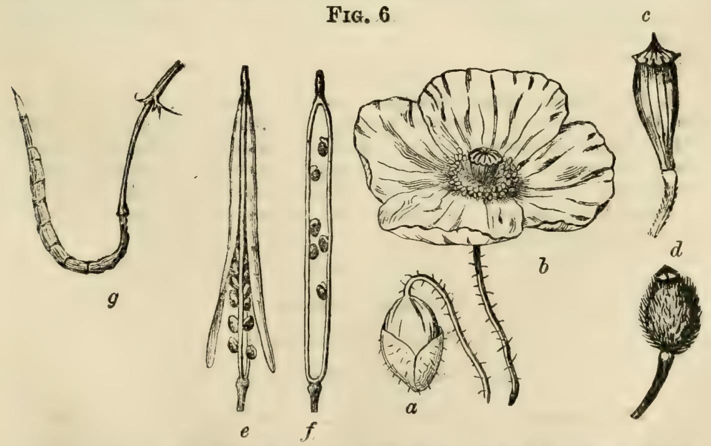


Fig. 6. (*a*) Bud of Papaver rhæas, L. showing the caducous sepals, separating like a hood. (*b*) Open flower of the same, showing 4 petals, numerous stamens, and obovate

ovary, crowned with a *convex* disk and rayed stigmas. (*c*) Ripe capsule of same, with *umbonate* disk. (*d*) Capsule of P. hybridum, L. (*e*) Silique of Chelidonium. (*f*) The same after separation of valves. (*g*) Loment of Hypecoum procumbens, L.

* *Flowers regular.*

1. PAPAVER. Ovary an incompletely several-celled capsule Stigmas 4-20.
2. RŒMERIA. Ovary 1-celled. Stigmas 3-4 Fruit elongated siliquiform.
3. GLAUCIUM. Ovary a silique with spongy partition, and 2-cells. Stigma 2-lobed.

* * *Flowers irregular, the similar petals opposite each other in pairs. Ovary 1-celled.*

4. HYPECOUM. Plants with orange-colored juice, and leaves dissected like those of Fumaria.

1. PAPAVER, L. Poppy. *Khishkhâsh.*

Sepals 2-3. Petals 4, rarely 5-6, crumpled in the bud. Stamens very numerous. Stigma sessile, united in a flat 4-20-rayed disk crowning the ovary. Capsules ovate club-shaped, or cylindrical, or elliptical, with parietal placentæ extending nearly to the axis, forming several to many false cells, opening by pores or chinks under the edges of the stigmas — Herbs, with generally milky or colored juice, the flower buds nodding.

* *Biennials. Flowers dull pinkish. Disk angled. Stigmas* 3-9.

1. P. Libanoticum, Boiss. ② Sparingly bristly. Stems low, ascending, simple, 1-*flowered, or somewhat branched below* 2-3-*flowered.* Leaves pinnatisect with *short,* crowded, oblong, *obtuse* lobes. Buds obovate. Capsule glabrous, *obovate-oblong,* 0.015 m. to 0.02 long, much broader than depressed-conical disk — Late Summer — Highest summits of Lebanon and Antilebanon.

2. P. Caucasicum, M. B. ② More or less bristly. Stems *much branched, many-flowered.* Leaves bipinnatisect or parted, with *elongated,* oblong or linear-lanceolate, *acute* lobes. Buds spherical. Capsule glabrous, rarely somewhat appressed hairy, *elliptical or oblong,* 0.01 m. long, broader than conical or pyramidal disk — Late Summer — Highest summits of northern Amanus, and Akkerdagh.

3. P. hyoscyamifolium, Boiss. et Haussk. ② Glaucous. Stem thick, *thyrsoid.* Leaves short, somewhat leathery, sparingly bristly, oblong-lanceolate, pinnatipartite, with short, triangular, slightly dentate lobes. Buds ovate. Capsule glabrous, oblong, *angled,* with abruptly tapering apex, and convex, 4-5-lobed disk, narrower than capsule — Summer — Chalky soil, 300 m. to 600; Aspadrul near Aintab, and northward.

* * *Annuals.*

† *Capsule glabrous.*

‡ *Filaments awl-shaped.*

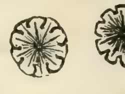
a. Stem leaves not clasping.

4. P. rhæas, L. ⊙ Corn-Poppy. *Shuqâïq un-nu'mân.* Bristly, rarely glabrescent. Leaves pinnately or bipinnately parted or cut, with oblong-lanceolate segments. Petals deep crimson, usually broader

than long. Anthers oblong or ovate. Capsule obovate, club-shaped, or oblong. Stigmas 6 to 10 — Spring — Fields and waste places, common everywhere.

This variable species should include *P. umbonatum*, Boiss. with umbonate capsule, (Fig. 6, *c*), probably **P. stylatum,** Boiss. et Bal., and **P. clavatum,** Boiss. et Haussk. It also includes var. **genuinum,** Boiss. with short obovate capsules, (Fig. 6, *b*); var. **oblongatum,** Boiss. with obovate-oblong capsules; var. **Syriacum,** Boiss., with oblong, club-shaped capsules. All these varieties vary with leaves entire or nearly so, or with segments more or less acute, sometimes linear, entire or toothed, sometimes obtuse, rarely lyrate. **P. dubium,** L. would seem to be only a variety with the scallops of the disk not overlapping. The scallops of fully ripe capsules seldom overlap. (see Fig. 7, *b*).

Fig. 7



a *b*

(*a*) Disk with overlapping scallops. (*b*) Disk with separated scallops. Plants of both varieties in all other respects as in P. rhæas.

5. P. polytrichum, Boiss. et Ky. ⊙ More or less hirsute. Leaves lanceolate, pinnatifid or pinnatisect, with *short*, *obtusely lobed* segments. Petals crimson. Anthers ovate-globose. Capsule club-shaped, obovate-oblong, with convex, or umbonate disk. Stigmas 7-8 — Spring — Rocky places and fields, Beirût, El-Koura, Antilebanon, Damascus, and northward. Too near the last.

b. Stem leaves clasping.

6. P. glaucum, Boiss. et Haussk. ⊙ *Glaucous*, *glabrous* with exception of a few bristles along peduncles. Radical leaves obovate-oblong tapering to a petiole; stem leaves cordate at base, *pinnately lobed or parted*, lobes triangular, obtusely toothed. Sepals glabrous. Petals crimson. Capsule *ovate*, stipitate. Disk flat, with broad scallops. Stigmas less than 12 — Early Summer — Tchermalik, in northern Syria.

‡ ‡ *Filaments club-shaped at apex.*

7. P. somniferum, L. ⊙ Common Poppy. *Glaucous*, glabrous, or sparingly bristly. Leaves *oblong*, unequally dentate below, cordate at base. Petals *white, or rose-colored with eroded-lobed margin*. Capsule obovate, stipitate, with *flat* disk — Spring.

Var. **glabrum,** Boiss. Stouter, glabrous, leaves less deeply lobed. Capsule large, flattened-spherical. Stigmas 10 to 12 — Escaped from cultivation. *Cultivated for Opium.*

† † *Capsule bristly.*

8. P. hybridum, L. ⊙ Setulose. Leaves bipinnatipartite, with linear segments. Petals vinous-red. Capsule (Fig. 6, *d*) *ovate-globular*, *copiously* beset with *strong*, needle-like, *curved* bristles. Disk *one-third as broad as capsule*, sulcate, obsoletely crenate — Spring — Fields; common.

9. P. Argemone, L. ⊙ Setulose. Leaves bipinnatisect, with acute lobes. Stem elongated, erect. Petals pale scarlet. Capsule (Fig. 8) *oblong-elliptical*, sparingly beset with *weak, straight* bristles. Disk *a little narrower than capsule* — Spring — Fields; less common than last.

FIG. 8



Capsule of P. argemone, L.

2. RŒMERIA, MEDIK.

Sepals 2. Petals 4, crumpled in the bud. Stamens numerous. Style short; stigmas capitate. Capsule slender, cylindrical, 1-celled, splitting into 3 or 4 valves — Annual herbs, with violet or crimson flowers.

1. R. hybrida, L. ⊙ Leaves 2-3-pinnatisect, with linear lobes. Petals 0.02 m. long, and 0.03 broad. Pods *with few, short bristles, or glabrescent, little broader than peduncle,* and generally much longer — Spring — Fields; common.

FIG. 9

Pod of R. hybrida.

2. R. Orientalis, Boiss. ⊙ *Salîhh.* Leaves pinnatisect or parted into ovate-oblong, lobed or dentate segments. Petals 0.01 m. long. Pods with *copious, spreading bristles, considerably broader than peduncle,* and usually shorter — Spring — Tara, east of Dead Sea, lesser desert, and eastward and southward.

3. GLAUCIUM, TOURN. HORN POPPY.

Sepals 2. Petals 4, crumpled in the bud. Stamens numerous. Stigma sessile, 2-lobed or horned. Pod linear, elongated, 2-celled by a spongy partition (siliquiform) — Annual, biennial, or perennial herbs, with saffron-colored juice, and buff, yellow, or rarely scarlet flowers.

* *Ovary more or less hairy or bristly.*

1. G. corniculatum, L. ⊙ *Hashîshat-ul-Mamîta.* All the leaves pinnatipartite, with oblong, dentate segments, and *truncate, lobed or dentate apex,* the lower leaves petioled, the upper *sessile, with truncate base* Sepals papillose, hairy. Pods appressed-hairy, hairs dilated at base — April to June.

Var. **Phœniceum,** D.C. Petals *orange-colored,* generally with a purple spot at base — Fields and roadsides, throughout.

2. G. Arabicum, Fresen. ② Glaucous. Radical leaves lyrate-pinnatipartite, with *ovate, obtuse,* dentate segments; upper leaves *clasping,* 3-5-*lobed.* Sepals papillose-hairy. Petals yellow. Pods beset with scattered bristles dilated at base, or glabrescent — Spring — Stony places, Khan Khadrûn, between Jerusalem and Jericho, and southward to Sinai.

Var. **grandiflorum,** Post. *Flowers as large as G. luteum.* Pods *hirsute* with long appressed hairs — Qaldûn, N. of Damascus (*perhaps G. grandiflorum, Boiss.*)

3. **G. grandiflorum,** Boiss. et Huet. ♃ Glaucous, tomentellous. Radical leaves pinnatisect, sublyrate, with obovate-oblong segments; upper leaves *clasping, pinnatipartite.* Sepals 0.05 m. long, papillose-hairy. Petals large, *orange-colored, with a violet spot at base.* Pod *hirsute with long, appressed bristles* — Spring — Valley of Cedron (Barbey).

4. **G. Aleppicum,** Boiss. et Haussk. ♃ *Green,* with sparse, papillary hairs. All the leaves pinnatipartite, with oblong segments, parted into *oblong, mucronate lobes.* Sepals 0.05 m. long, *glabrous,* or papillose-hairy. Petals *large, crimson.* Young pod appressed-hirsute. – June — Calcareous fields among grain. Aintab to Aleppo.

* * *Ovary more or less tuberculate, not hairy.*

5. **G. luteum,** Scop. ② Glaucous, more or less papillose-velvety. Radical leaves pinnatipartite-lyrate with ovate-oblong, lobed, rarely parted, segments; upper leaves *ovate, sinuate-lobed,* with *broad, cordate, clasping base.* Sepals more or less papillose-hairy. Petals yellow, *large,* 0.04 m. long. Pod *very long,* 0.15 m. to 0.20, *scabrous with white tubercles* — Summer — Rocky and sandy places along coast. (*G. flavum, Crantz*).

6. **G. leiocarpum,** Boiss. ♃ Papillose or glabrescent. Radical leaves lyrate, segments oblong, sinuate-dentate; upper leaves clasping at base, ovate or oblong, sinuate-toothed or lobed. Sepals sparsely papillose, or glabrescent. Petals yellow, *half as large as in last,* 0.02 m. long Pods *slightly tuberculate,* 0.10 m. to 0.15 long, *slightly torulose* — Summer — Subalpine regions of Lebanon and Antilebanon. Foliage and inflorescence much smaller than in last. (*Perhaps G. vitellinum, Boiss. et Buhse, the only difference seeming to be the smooth pods of the latter*).

4. HYPECOUM, L.

Sepals 2. Petals 4, convolute in bud, in opposite pairs, the outer entire or trilobed larger than the inner, which are tripartite. Stamens 4. Stigmas 2. Pod a loment, with 1 seeded cells, often separating into joints when the pod is ripe — Annual herbs, with yellow, narcotic juice, and bipinnatisect, dissected leaves, intermediate between Papaveraceæ and Fumariaceæ.

* *Exterior petals (Fig. 10 and 11 a.) tri-lobed. Lobes of leaves oblong, or oblong-linear.*

1. **H. procumbens,** L. ⊙ Stem *ascending* or *prostrate.* Sepals more or less acuminate, denticulate or entire. Lateral lobes of inner petals oblong, entire, shorter than middle stipitate, *subcordate, cochleariform, ciliate* lobe. Pods (Fig. 6, *g.*) erect-recurved, striate, nodose at joints — Spring — East of Jordan. Southern Palestine, and southward.

FIG. 10



Outer petal of H. procumbens; natural size.

Var. **grandiflorum,** Post. Stems *erect.* Leaves more dissected and with longer lobes than in type. Flowers larger, and verging toward orange-color. Lateral

lobes of inner petal longer than middle one — Dry hill sides and fields; common throughout. (*H. grandiflorum*, *Benth.*)

2. H. imberbe, Sibth. ⊙ Stems ascending or prostrate. Sepals dentate. Inner petals *with violet-base*, the middle lobe *boat-shaped, with entire margin.* Pods *slender*, erect, curved, striate, *scarcely swollen at joints* — Spring — Gaza and southward.

3. H. parviflorum, Barb. ⊙ *Glaucous.* Stems prostrate, often half buried in sand. Flowers *minute.* Lateral lobes of inner petals *violet, considerably shorter than* middle stipitate, cochleariform, *fimbriate* lobe. Pod slender, moniliform, generally straight, often with tumid joints, where stung by insects — Early Spring— Lesser desert. Both this and the last may prove on further study to be varieties of *H. procumbens*, L.

FIG. 11



a. An outer petal of H. parviflorum, Barb.
b. An inner petal; both twice as large as natural size.

* * *Exterior petals elliptico-rhomboid, entire. Lobes of leaves linear-awl-shaped.*

4. H. pendulum, L. ⊙ *Salîhh.* Stem erect. Inner petals somewhat smaller than outer, the middle lobe stipitate, nearly *orbiculate*, ciliate. Pods *straight, refracted, obsoletely* 2-6 *ribbed, separating late or not at all into joints* — Spring — Sinai and Arabia Petræa; east of the Jordan and Lebanon, to Aleppo, and northward.

ORDER V. FUMARIACEÆ. (FUMITORY FAMILY).

Tender, glabrous herbs, with watery juice, usually much dissected leaves, irregular flowers, with 4 free or somewhat united petals, and 6 diadelphous stamens opposite the outer petals. Corolla flattened, closed at apex ; the 4 petals in pairs, the similar ones opposite each other ; the outer with spreading tips, and (in ours) the upper only spurred at base ; the inner narrower, with callous tips united over the stigma. Stamens in two sets of 3 each, united by their filaments ; the middle anther of each set 2-celled, the lateral 1-celled. Pod either a 1-celled, 1-seeded, indehiscent nutlet, or a silique.

1. CORYDALIS. Fruit an ovate, or oblong-lanceolate silique.
2, CERATOCAPNUS. Lower fruits urn-shaped nutlets with a conical lid, upper oblanceolate capsules with an ensiform beak.
3. FUMARIA. Fruit a globular, 1-seeded nutlet.

1. CORYDALIS, D.C. CORYDALIS.

Upper set of stamens long-spurred at base. Stigma 2-lobed. Silique many seeded; seeds arillate — Perennials, (ours) with tuberous roots, and terminal racemes of handsome flowers.

1. C. rutæfolia, Sibth. ♃ (Fig. 12) Stem destitute of scales at base. Stem leaves *opposite*, short-petioled or sessile, 1-2-ternately-parted, leaflets petiolulate, entire or trisect, with *large ovate, rhomboidal, or elliptical lobes.* Flowers *deep rose-colored, crescentic, with upturned spur.* Silique ovate — April and May — Alpine and subalpine regions of Lebanon, Antilebanon, Amanus, and northward.

2. C. solida, Smith. ♃ Stem scaly at base. Stem-leaves *alternate*, long-petioled, 2-ternately parted, and *dissected into small, oblong lobes.* Flowers *pallid;* spur *straight, or somewhat deflexed at apex.* Silique oblong-lanceolate — Spring — Middle and subalpine regions of Lebanon, Antilebanon, Nusairy Mountains, and northward.

FIG. 12

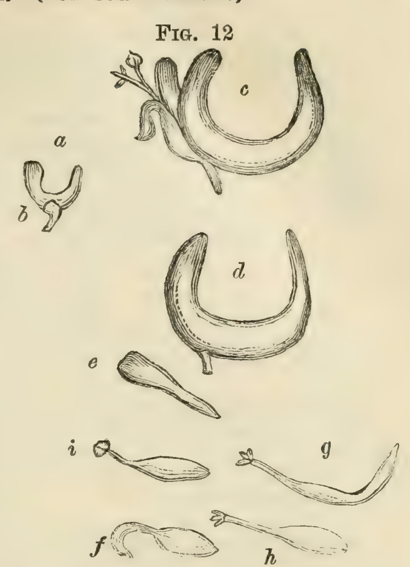


Fig. 12. (*a*) Flower bud of Corydalis rutæfolia, Sibth. (*b*) One of the caducous sepals. (*c*) A flower, after the separation of the calyx. (*d*) The upper petal. (*e*) A lateral petal. (*f*) The lower petal. (*g*) The upper set of stamens, with a long spur. (*h*) The lower set of stamens, without spur. (*i*) The pistil, with its slender style, and 2-lobed stigma.

2. CERATOCAPNOS, Durieu.

Upper set of stamens spurred at base. Stigma minute, flattened, dilated. Nutlets 1-seeded; capsules 1-2-seeded; seeds not arillate — Perennial, climbing, tendril-bearing vines, with short racemes of small rose-colored flowers.

C. Palæstina, Boiss. ♃ Leaves 1-2-ternate; leaflets petiolulate, ovate, obtuse, entire, mucronulate. Bracts in flower a little longer, and in fruit a little shorter than pedicel — Feb. to May — Hedges and rocks; coast range and maritime plains of Syria and Palestine.

3. FUMARIA, L. Fumitory. *Shahtarraj. Riz-ud-dejâj.*

Spur of upper set of stamens often obsolete. Stigma 2-horned. Nutlet indehiscent. Seeds not arillate — Annuals, without tendrils, with finely dissected leaves and small flowers in dense racemes or spikes.

ARTIFICIAL KEY TO THE SPECIES.

* *Fruiting pedicels recurved. Sepals broader than corolla.*

7, F. Capreolata, 6, Anatolica, 8, Thureti.

* * *Fruiting pedicels erect or spreading*

† *Flowers smaller than F. officinalis, ie., less than* 0.01 *m. long.*

‡ *Sepals broader than corolla,*

5, F. micrantha.

‡ ‡ *Sepals narrower than corolla, or wanting.*

2, F. Vaillantii, 3, parviflora, 4, asepala.

† † *Flowers as large as, or larger than F. officinalis, ie.,* 0.01 *m. or more in length.*

a. Sepals as broad as, or broader than corolla.

11, F. Gaillardoti.

b. Sepals narrower than corolla,

1, F. officinalis, 9, macrocarpa, 10, Judaica.

§ **1. OFFICINALES.** *Flowers* 0.01 *m. long, or less. Fruit nearly smooth.*

1. F. officinalis, L. ⊙ Lobes of leaves flat, oblong-linear. Sepals ovate, acuminate, *acutely dentate*, a little narrower than pink corolla, and one-third as long. Bracts a *little shorter* than erect-spreading fruiting pedicels. Fruit *obcordate, broader than long* — Spring — Ba'albek and northward.

2. F. Vaillantii, Loisel ⊙ Glaucous, rigid. Lobes of leaves flat, narrowly linear. Sepals oblong, acute, dentate, *narrower than pedicel*, one-eighth to one-tenth as long as pink corolla. Bracts as long as erect-spreading fruiting pedicels. Fruit globular, *obtuse* — Spring — Aleppo.

3. F. parviflora, Lam. ⊙ Glaucous, *diffuse.* Lobes of leaves narrowly-linear, *obtuse.* Sepals ovate, dentate, acute, *a little broader than the pedicel*, one-sixth as long as *white, rarely pinkish* corolla. Bracts as long as erect-spreading fruiting pedicels. Fruit globular, *apiculate* — Feb. to May — Fields and grassy places ; everywhere.

4. F. asepala, Boiss. ⊙ Glaucous, *rigid, low, compact.* Lobes of leaves flat, oblong-linear, *acute.* Racemes *few flowered*, nearly sessile, *overtopped, and more or less concealed by upper leaves.* Sepals *usually abortive.* Corolla white. Bracts as long as erect-spreading fruiting pedicels. Fruit globular, apiculate — Feb. to May — Fields; Phœnician coast and Lebanon to Aintab, and northward.

5. F. micrantha, Lag. ⊙ Green. Compact, erect or spreading. Lobes of leaves narrowly linear. Sepals *round-ovate*, half as long as, and broader than rose-colored corolla. Bracts somewhat longer than *erect-spreading* fruiting pedicels. Fruit globular, somewhat keeled, obtuse — Spring — Fields; common.

6. F. Anatolica, Boiss. ⊙ Green. Compact, erect or spreading. Lobes of leaves narrowly-linear. Sepals, *ovate-acuminate*, dentate, half as long as, and a little broader than pink corolla. Bracts larger than *recurved* fruiting pedicels. Fruit globular, obtuse — Spring — Fields; Mt. Carmel to Aintab, and northward. Too near *F. micrantha.*

§ **CAPREOLATÆ.** *Flowers between* 0.01 *m, and* 0.015 *long. Fruit nearly smooth. Pedicel recurved.*

7. F. capreolata, L. ☉ (Fig. 13). Lobes of leaves flat *obtuse.* Sepals ovate, acute, dentate, *somewhat broader than,* and *half as long as white, purple-tipped* corolla. Bracts shorter than fruiting pedicel. Fruit somewhat compressed, globular, *obtuse* — Spring — Diffuse, climbing or pendulous on hedges and walls; maritime region and coast ranges; Banias.

8. F. Thureti, Boiss. ☉ Lobes of leaves *minute,* oblong-linear, *acute.* Sepals ovate, repand-dentate, somewhat broader, and one-half to one-third as long as *deep pink* corolla. Bracts a little shorter than fruiting pedicel. Fruit ovate-globose, *acutish* — Spring — Near Ehedin. *Too near F. Anatolica.*

§ 3, **AGRARIÆ.** *Flowers between* 0.01 m. *and* 0.015 *long*, *Fruit tubercled*

9. F. macrocarpa, Parl. ☉ Lobes of leaves oblong, rather obtuse. Sepals lanceolate-linear, much narrower, and *one-third* as long as pale-pink, *greenish-tipped* corolla. Bracts about as long as erect-spreading fruiting pedicels. Fruit *large,* globular, *slightly compressed, scarcely keeled* — Spring — Fields and rocky places; maritime regions, and coast ranges.

FIG. 13



Fig. 13. (*a*) Flower of Fumaria capreolata, L. (*b*) One of the sepals somewhat enlarged. (*c*) Upper petal. (*d*) Lower petal. (*e*) One of the lateral petals. (*f*) Upper set of stamens with its spur. (*g*) The pistil with 2-horned stigma. (*h*) The nutlet with the bract subtending its pedicel.

10. F. Judaica, ☉ Lobes of leaves oblong, acutish. Sepals oblong-lanceolate, much narrower, and *one-fourth* as long as pale-pink, purple-tipped corolla. Bracts from *half as long* to as long as fruiting pedicels. Fruits *smaller than the last, compressed, keeled, obtuse* — Spring — Hedges, and stony places, maritime plain and coast ranges. *Too near F. macrocarpa.*

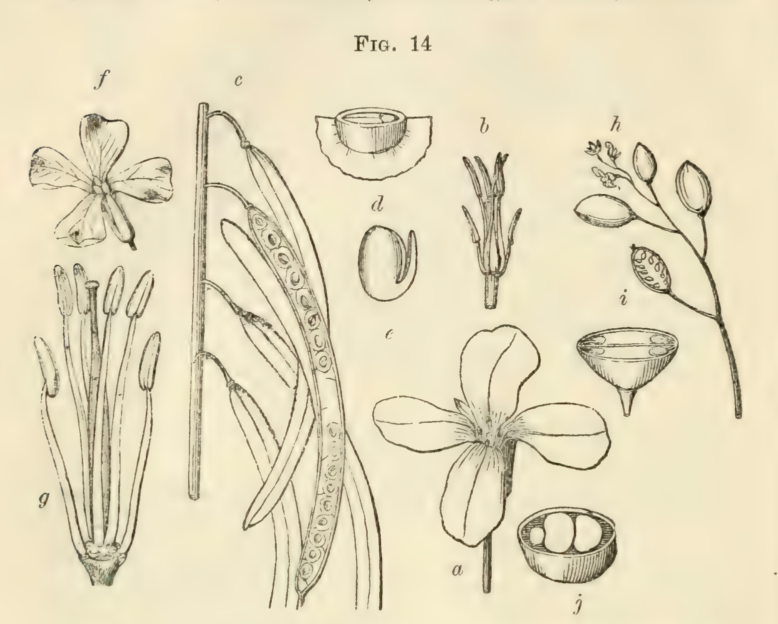
11. F. Gaillardoti, Boiss. ☉ Lobes of leaves oblong, obtuse. Sepals oblong, acute, dentate at base, *as broad, and half as long as* pale, purple-tipped corolla. Bracts *longer* than erect-spreading, *or somewhat recurved* fruiting pedicels. Fruit globular, compressed, keeled, obtuse, mucronulate — Spring — Phœnician plain, and lower regions of coast ranges.

ORDER VI. CRUCIFERÆ. (MUSTARD FAMILY).

Herbs or shrubs with pungent, watery juice, usually alternate leaves, and cruciform, tetradynamous flowers; fruit a silique, silicle, indehiscent 1-*celled nutlet, or loment.* — Sepals 4, generally caducous. Petals 4, hypogynous, generally regular, opposite each other in pairs, their spreading limbs

forming a cross. Stamens 6, 2 of them shorter, and inserted lower down, (rarely 4 or 2). Ovary consisting of two coalesced carpels, 2-, rarely 1-celled ; style and stigma entire, or 2-lobed.

FIG. 14



Fig, 14. (*a*) Flower of Mustard, enlarged. (*b*) The tetradynamous stamens, also enlarged. (*c*) Siliques of Arabis turrita, L., one of them with the valve gone, showing the seeds suspended from the marginal placentæ. (*d*) A seed cut crosswise, much enlarged, showing the accumbent cotyledons, and the wing around the seed. (*e*) The embryo (*f*) A flower of Matthiola, (*g*) Its tetradynamous stamens, enlarged, (*h*) A raceme of Draba. (*i*) A silicle of the same, cut across, showing the partition, and seeds suspended from marginal placentæ. (*j*) One of the seeds cut across, much enlarged, showing the incumbent cotyledons.

SUBORDER I. **SILIQUOSÆ.** Pods siliques, linear, or oblong (except in Anastatica 11, Savignya 24, and Carrichtera 25), dehiscent for their whole length, or all except the apex (except in Andreoskia). Valves parallel to septum, and equalling it in breadth.

TRIBE I. **ARABIDEÆ.** Seeds orbicular or oval, in one row (except in Nasturtium 3, Nasturtiopsis 4, and Arabis 6). Cotyledons accumbent (in Nasturtiopsis 4, incumbent).

* *Not desert plants.*

1. MATTHIOLA. ♃ ⊙ Woolly herbs. Flowers pinkish-purple, yellow, or livid. Pods flattened, often 2-horned.
2. CHEIRANTHUS. ♃ Canescent, shrubby plants. Flowers large, yellow. Pods 4-angled.
3. NASTURTIUM. ♃ Glabrous or glabrescent herbs. Flowers white. Pods linear, or oblong, turgid. Seeds in 2 rows,
5. BARBAREA. ♃ ② Glabrous herbs ; stems 4-angled. Flowers yellow. Pods 4-angled.

6. AARBIS. ♃ ② ⊙ Herbs, usually pubescent; radical leaves spathulate. Flowers white pink, or yellow. Pods linear, flattened, 1-nerved. Seeds sometimes in 2 rows.

7. CARDAMINE ⊙ Glabrous herbs. Flowers white. Pods flattened. Nerves 0.

9, ANDREOSKIA. ⊙ Glabrous herbs. Flowers white. Pods linear, keeled, 2-horned.

* * *Desert plants, or plants of Jordan Valley.*

4. NASTURTIOPSIS. ⊙ Green herbs. Flowers yellow. Pods short, cylindrical, turgid.

8. MORETTIA. ♃ Prostrate, stellate-tomentose herbs. Flowers whitish-pink. Pods oblong, terete.

10. NOTOCERAS. ⊙ Dwarf, appressed-canescent herbs. Flowers minute, white. Pods oblong, keeled, 2-horned

11, ANASTATICA. ⊙ Dwarf stellate-canescent herbs. Flowers minute, white. Pods ovate-spherical, auricled.

TRIBE II. **SISYMBRIEÆ**. Pods linear. Seeds thickish, mostly oblong, usually in 1 row. Cotyledons incumbent, or obliquely accumbent.

* *Stigma bilamellate.*

12, HESPERIS. ♃ Flowers pinkish-purple, or livid. Robust herbs.

13. MALCOLMIA. ⊙ Flowers white, pink, or yellow. Delicate herbs.

14, EREMOBIUM. ⊙ Flowers pink. Confined to sands of coast, and deserts.

* * *Stigma sessile, or with* 2 *short lobes.*

† *Neither canescent, nor clothed with branching, appressed hairs.*

15, SISYMBRIUM. ⊙ ② Leaves pinnatifid or parted. Flowers yellow, purple, or white.

16. ALLIARIA. ② Leaves ovate-cordate, or reniform. Flowers white.

17. CONRINGIA. ⊙ Leaves oblong, or elliptical, clasping. Flowers yellow.

† † *Canescent with appressed, branching hairs.*

18. ERYSIMUM. ♃ ② ⊙ Flowers yellow, or purple.

TRIBE III. **BRASSICEÆ**. Pods linear, or oblong (except Savignya 24, and Carrichtera 25). Cotyledons conduplicate.

* *Pods linear, or oblong,*

† *Seeds in one row, wingless. Flowers white, or yellow.*

19. BRASSICA. ⊙ Valves 1-nerved.

20, SINAPIS. ⊙ Valves 3-nerved.

† † *Seeds in two rows, wingless. Flowers yellow, or pinkish-purple.*

21. DIPLOTAXIS. ⊙ Valves 1-nerved. Flowers yellow.

22. MORICANDIA. ♃ ⊙ Valves 1-nerved. Flowers pinkish-purple,

* * *Pods oblong, elliptical, or nearly spherical, beaked.*

23. ERUCA. ⊙ Pods oblong ; beak ensiform. Flowers pinkish-purple, or yellow.

24. SAVIGNYA. ⊙ Pods elliptical, chartaceous ; beak aristate. Flowers pink.

25. CARRICHTERA. ⊙ Pods nearly spherical ; beak chartaceous. Flowers yellowish-white.

SUBORDER II. **SILICULOSÆ**. Pods silicles (occasionally oblong, or linear), dehiscent for their whole length, or nearly to their apex,(or nearly indehiscent,Coluteocarpus 30).

SERIES A. Valves flattened parallel to septum, or not flattened.

TRIBE IV. **ALYSSINEÆ**. Pods ovate, elliptical, lenticular, orbiculate, or oblong. Seeds in 1-2 rows, or sometimes 1 in each cell. Cotyledons accumbent.

* *Pods* 0,01 *m. to* 0,05 *long, elliptical, oblong, or linear, sometimes sinuate*

26, RICOTIA. ⊙ Pods elliptical, chartaceous, flattened ; seeds 2-8, wingless. Flowers pink.

27. FARSETIA. ♃ Pods elliptical, or linear ; seeds ∞, winged. Flowers purplish.

28. FIBIGIA. ♃ Pods elliptical, 0.02 m. long; seeds ∞, winged. Flowers yellow.
29. AUBRIETIA. ♃ Pods elliptical, 0.01 m. long, pubescent. Leaves scattered. Flowers pinkish-purple.
30. COLUTEOCARPUS. ♃ Pods ovate, 0.02 m. long, glabrous. Root-leaves rosetted. Flowers white.

* * *Pods less than* 0.01 m. *long, lenticular, elliptical, globular, or orbicular.*

31. KŒNIGA. ♃ ☉ Pods orbicular, flattened. Flowers white.
32. ALYSSUM. ♃ ☉ Pods orbicular, or lenticular, flattened. Flowers yellow, or yellowish-white.
33. DRABA. ♃ Pods lenticular, or elliptical. Petals entire, or notched, yellow, or white.
34. EROPHILA. ♃ Pods elliptical. Petals 2-lobed or parted, white.

TRIBE V. **CAMELINEÆ.** Pods oblong-linear, ovate, obovate, or orbicular. Seeds in 2 rows. Cotyledons incumbent.

35. LEPTALEUM. ☉ Pods oblong-linear. Dwarf, 0.05 to 0.10 m. Glabrous plants.
36. CAMELINA. ☉ Pods ovate, obovate, or orbicular. Tall, 0,30 to 0,50 m.

SERIES B. Valves flattened contrary to partition.

TRIBE VI. **LEPIDINEÆ.** Pods ovate, obovate, obcordate, orbicular, or elliptical: valves boat-shaped. Cotyledons incumbent, conduplicate, or convolute.

37. CAPSELLA. ☉ Pods obcordate, or ovate, wingless; seeds numerous.
38. LEPIDIUM. ♃ ② ☉ Pods ovate, elliptical, or orbicular, wingless, rarely winged. Stamens 4 or 2. Flowers minute, white, or yellow.
39. ÆTHIONEMA. ♃ ☉ Pods obcordate or ovate, winged. Flowers pink, purple, or rarely white.

TRIBE VII. **THLASPIDEÆ.** Pods composed of twin, orbicular cells, or oblong, ovate, obovate, obcordate, or obtriangular. Cotyledons accumbent.

40. BISCUTELLA. ☉ Pods composed of twin, orbicular cells.
41. HELDREICHIA. ♃ Pods obovate-truncate, broader than long. Alpine plants.
42. THLASPI. ② ☉ Pods obcordate, or oblong. Flowers racemed, sometimes irregular.
43. IBERIS. ② ☉ Pods ovate, obcordate, or obovate-horned. Flowers in umbels, irregular.
44. TEESDALIA. ☉ Pods obovate, keeled, winged. Flowers racemed, minute, white.
45. CARPOCERAS. ② Pods obtriangular, horned.

SUBORDER III. **NUCAMENTACEÆ.** Pods indehiscent, twin, or single nutlets, wingless, or winged.

TRIBE VIII. **SENEBIERIEÆ.** Pods twin, 1-celled nutlets. Cotyledons narrow, incumbent.

46. SENEBIERA. ② ☉ Pods broader than long, rough-tubercled.

TRIBE IX. **ISATIDEÆ.** Pods single nutlets, winged or wingless, 1 celled with 1-2 seeds, or 2-4-celled with 1 seed in each cell.

* *Pods winged.*

† *Cotyledons accumbent. Pods orbicular, or obovate.*

47. PELTARIA. ♃ Pods large, 0.01 m. Stamens not appendaged. Tall, glabrous herbs.
48. CLYPEOLA. ☉ Pods small, 0.004 m. or less. Low, canescent herbs.

† † *Cotyledons incumbent. Pods ovate, oblong, or linear.*

49. ISATIS. ♃ ☉ Pods bony or horny, with leathery or papery wings.

† † † *Cotyledons wrinkled lengthwise. Pods ovate.*

50. BOREAVA. ⊙ Pods 4-winged. Plants with habit of Bunias.

** * Pods wingless (except Bunias).*

† Cotyledons incumbent, flat, or transversely wrinkled.

51, NESLIA. ⊙ Pods small, 0.02 m., oblate-spheroidal ; style awl-shaped.

† † Cotyledons wrinkled lengthwise.

52. TEXIERA, ⊙ Pods spherical, smooth, pendent by delicate peduncles.
53. CALEPINA. ⊙ Pods ovate-spherical, rough ; style apiculate.
54. SCHIMPERA. ⊙ Pods obliquely ovate, with oblique beak. Desert herbs.

† † † Cotyledons accumbent,

55. MYAGRUM. ⊙ Pods violin-shaped ; style awl-like ; cells 3, the central fertile.
56. EUCLIDIUM. ⊙ Pods small, 2-celled, appressed to stem. Low, rigid herbs.
57. OCHTHODIUM. ⊙ Pods small, 2-celled, peduncled, with 4 rough-tubercled angles.

† † † † Cotyledons curved, or convolute.

58. BUNIAS. ⊙ Pods 4-angled, winged, keeled, 4-2 celled, cells in pairs,

† † † † † Cotyledons conduplicate.

59. ZILLA, ♄ Pods ovate-pyramidal, 2-celled. Thorny desert shrubs.

SUBORDER IV. **LOMENTACEÆ.** Loments transversely 2-jointed ; lower joint indehiscent, seedless ; or dehiscent, 2-celled, 2 - ∞, seeded ; or more or less obsolete : upper joint indehiscent, 1-celled 1 - ∞-seeded, or 2- ∞-celled, cells in 1-2 rows, 1-seeded.

TRIBE X, **CAKILINEÆ.** Lower joint of loment conspicuous, indehiscent, seedless ; or dehiscent, seedless or seeded. Upper joint 1-celled, 1-6-seeded, or with 1-4 cells, in one row.

** Lower joint of pod indehiscent.*

60. CRAMBE, ♃ Lower joint pedicilliform, seedless ; upper globular, obsoletely ribbed.
61. RAPISTRUM. ⊙ Lower joint obovate, seedless ; upper ovate, ribbed.
62. DIDESMUS. ② ⊙ Lower joint oblong, seedless ; upper ovate-pyramidal, ribbed.
63. CAKILE. ⊙ Lower joint barbed at base ; upper ensiform, 1-seeded.
64. ENARTHROCARPUS. ⊙ Loment elongated ; each of its joints 2-6-seeded.

** * Lower joint of pod dehiscent, 2-valved, in ours 2-4 seeded,*

65. ERUCARIA. ⊙ Lower joint cylindrical, 2-4 seeded, upper globular, or oblong, 1-4 celled,

TRIBE XI. **RAPHANEÆ.** Loments, with obsolescent or obsolete lower joint : upper joint 1-celled, ∞-seeded ; or with numerous, 1-seeded cells in 1-2 rows, cells at length separating.

** Cells of upper joint 1 - ∞ in 1-row, or 2-6 in two rows.*

66, RAPHANUS. ⊙ Lower joint rudimentary. Seeds globular.
67, ANCHONIUM. ♃ Lower joint obsolescent. Seeds oblong, broad.

** * Lower joint obsolete. Cells of upper joint ∞, in 2 rows.*

68. CHORISPORA. ⊙ Sterile cells usually alternating with fertile. Style long,
69. STERIGMA. ② All the cells fertile. Style short,

1. MATTHIOLA, R. BR. STOCK. *Menthûr.*

Calyx erect, saccate at base. Petals clawed. Pods with thick septum ; lobes of stigma erect, connivent, decurrent along style, often horned — Woolly or canescent herbs, with stellate, or branching hairs, and purplish, yellowish, or livid flowers.

* *Perennials. Horns of stigma* 0, *or very short*, 0.002 *m. long. Petals purplish, livid, or dingy-yellow.*

1. M. albicaulis, Boiss. ♃ Stellate-velvety. Stem 1 m. to 1.20, sulcate, angled. Leaves oblong, *entire*, acute, 0.10 to 0.15 m. long. Petals dingy-purple. Pods *glabrous*, 0.12 m. long, and 0.006 broad ; stigma *narrow*. Seeds with broad wing — April to May — Moab?, and eastward to Persia.

2. M. crassifolia, Boiss. et Gaill. ♃ Densely woolly with *branching* hairs; base bushy. Leaves *oblong*, entire, *or obsoletely sinuate, obtuse.* Petals *purplish*. Pods 0.10 m. long, and 0.004 broad, woolly ; stigma a little narrower than ripe pod — April to June — Rocks; Phœnician coast, and probably southward.

Var. **pinnatifida,** Post. Lower leaves more or less pinnatifid — Beirût.

3. M. Damascena, Boiss. ♃ Densely woolly with branching hairs ; stems simple or branched at base. Leaves *ovate-oblong*, sinuate, or coarsely 2-3-toothed-lobed. Petals *dingy-yellow*. Pod 0.15 m. long, 0.003 broad, woolly ; stigma *much narrower* than ripe pod — April to June — Antilebanon. Damascus.

4. M. tristis, L. ♃ Appressed-canescent, much branched, shrubby at base. Leaves *linear*, entire, or 1-2-dentate-lobed on each side. Flowers sessile ; petals *livid, or purplish.* Pods slender, 0.07 to 0.08 m. long, spreading ; stigma with lateral tubercles, or horizontal, acute horns, 0.002 m. long — Early Summer — Pits at quarries ; Beirût (*Blanche*).

5. M. Arabica, Boiss. ♃ Woolly-canescent, 0.75 m. to 1 m. high, many stemmed, rigid, branching from base. *All the leaves lanceolate-linear, entire.* Flowers sessile ; petals livid. Pods spreading, pubescent, 0.05 m. long, *incurved-twisted ;* stigma ovate, somewhat broader than pod — Spring — Ut Tîh, and eastern desert.

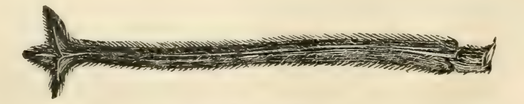
* * *Annuals. Stigma 2-horned. Pods terete.*

† *Lamina of petals obovate or oblong, purple or pink.*

6. M. humilis, DC. ⊙ Ashy-velvety, 0.10 m. Leaves linear, or lanceolate, dentate, or pinnatifid. Flowers sessile. Pods 0.03 m. to 0.05 long, 0.0015 broad ; stigma *short, conical, or bigibbous ;* horns 0.001 m. to 0.002 long, *horizontal* — Spring — Gaza, and southward to Egypt.

7. M. tricuspidata, L. ⊙ *Canescent*, low, 0.15 m. to 0.20, diffusely branching from base. Leaves oblong, sinuate-pinnatifid, with rounded lobes. Pods 0.06m. long, 0.002 broad, spreading, woolly; stigma *conical*, with divergent or horizontal, awl-shaped horns, *equalling or exceeding it in length* — March and April — Sands along coast; common.

Fig. 15



Pod of M. tricuspidata.

8. M. bicornis, Sibth. et Sm. ⊙ 0.40 m. *Ashy-puberulent,* branching. Leaves oblong-lanceolate, pinnatifid, the *upper linear, entire.* Pods 0.06 m. long, 0.001 broad ; stigma *very short, obtuse,* with horizontal or *incurved* horns, 4 *or* 5 *times as long as diameter of pod* — April and May — Fields ; Aintab and northward.

9. M. aspera, Boiss. ⊙ Rough with branching hairs, *greenish.* Stem low. Leaves oblong-lanceolate, obtuse, *obsoletely repand.* Pods rigid, spreading; stigma conical, more or less elongated, with erect or divergent, awl-shaped horns, *twice as long as diameter of pod* — Spring — Desert of Judæa.

† † *Lamina of petals linear-lanceolate, livid, wavy-margined.*

10. M. oxyceras, DC. ⊙ *Qurainah.* Canescent, glandular. Leaves oblong-lanceolate, *sinuate, or pinnatifid.* Pods 0.07 m. long, 0.001 broad, terete, *torulose ;* horns of *prominent* stigma acute, awl-shaped, 4-6 *times as long as diameter of pod,* horizontal or deflexed — March to May — Waste places; Palmyra to Cœlesyria, Moab, southern Palestine, and southward.

Var. **lunata,** Boiss. Stigma short, obtuse ; horns horizontal, or *incurved* — Lower Jordan valley.

Var. **forcipifera,** Boiss. Stigma short ; horns short, broad at base, incurved, *with introflexed tips,* often contiguous — Aleppo.

Var. **brevicornis,** Post. *Jerba'.* Pods often contorted. Stigma more or less prominent ; horns horizontal or *deflexed, once or twice as long as diameter of pod* — Same range as type. (*M. livida Del.*)

2. CHEIRANTHUS, D.C. HAND-FLOWER.

Calyx erect, saccate at base. Petals clawed, yellow. Pods 4-angled, flattened ; valves 1-nerved ; lobes of stigma divergent — Perennials, shrubby at base, canescent with bipartite hairs.

C. Cheiri, L. ♃ Wall-flower. Leaves lanceolate-linear, entire, or somewhat dentate. Flowers 0.02 m. long, deep-yellow, fragrant — Spring — Antioch.

3. NASTURTIUM, R. Br. WATER-CRESS. *Jerjâr.*

Sepals equal, spreading. Petals entire, clawed. Pods generally turgid, more or less flattened, valves nerveless, or obsoletely 1-nerved; stigma nearly simple. Seeds in 2 rows, minute — Glabrous, or sparingly hairy, perennial herbs.

* *Flowers white. Glands* 4, *placental.*

1. N. officinale, L. ♃ Common Water-Cress. *Reshâd. Qurrah.* Leaves pinnate, 3-7 pairs ; leaflets repand-elliptical, terminal round-ovate, cordate at base. Pods *oblong-linear,* 0.015 to 0.02 m. long, and 0.002 m. broad, longer than nearly horizontal pedicels, often incurved; seeds pitted — March to July — Wet places ; common.

* * *Flowers yellow. Placental glands* 4, *valvular* 2.

2. N. sylvestre, L. ♃ Leaves pinnatisect or pinnatifid, with *blong, or lanceolate,* entire, dentate, or pinnatifid segments ; upper

leaves *often linear*. Pods *linear*, 0.01 m. long, and 0.001 m. broad, as long as horizontal pedicels ; seeds somewhat rough — April to June — Streams and wet meadows ; subalpine Lebanon.

3. N. coronopifolium, DC. ♃ Stem nearly naked, ascending. Leaves *pinnatifid-dentate*, (resembling those of Plantago Coronopus) *pubescent*. Pods linear, incurved, as long as pedicel — Spring — Southern end of Dead Sea.

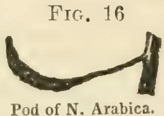
4. N. macrocarpum, Boiss. ♃ Radical leaves long-petioled, oblong, entire, toothed, or lyrate-pinnatifid ; stem-leaves auricled, divided into *long, narrow, linear, entire* lobes. Fruiting raceme zigzag. Pods linear, 0.05 m. long, 0.001 broad, *four or five times as long as the erect-spreading pedicel*, tapering at point — April to June — Lebanon and Antilebanon ; rare.

4. NASTURTIOPSIS, Boiss.

Calyx equal at base. Petals clawed, entire. Placental glands 2, elongated ; valvular, semiannular. Stigma simple. Pods oblong, turgid ; seeds in 1 or 2 rows ; cotyledons incumbent — Annuals with yellow flowers, resembling Nasturtium.

N. Arabica, Boiss. ⊙ Sparingly pubescent, green. Leaves oblong, dentate, or pectinate-pinnatifid. Pods 0.012 m. long, 0.0015 broad, incurved, as long as slender pedicels — March — Ut-Tîh and southward.

Fig. 16



Pod of N. Arabica.

5. BARBAREA, R. Br. Winter-Cress. Yellow-Rocket.

Calyx equal at base. Petals clawed, entire. Pod oblong, or linear ; valves keeled, or ribbed : stigma somewhat retuse. Seeds elliptical — Biennial, or perennial, glabrous herbs, with yellow flowers.

1. B. plantaginea, DC. ② ♃ Lower leaves ovate-oblong, petiolate, or sublyrate, *lateral lobes usually minute, tooth-like ;* upper leaves *short auricled at base, oblong, dentate*. Flowering racemes *dense*. Pods 0.03 m. or more long, erect-spreading, curved, with a rather long, slender style — May to July — Mountains ; Besherri ? ; north of Aintab, and northward.

2. B. minor, Koch. ♃ Rhizome horizontal. Root-leaves long-petioled, small, ovate-oblong, entire, or obsoletely repand, or sublyrate ; stem-leaves *long-auricled at base, incised-pinnatifid, or lyrate*, the uppermost undivided, incised-dentate. Pods 0.02 m. long, 0.002 broad, horizontal ; style apiculate — May and June — Wet places ; subalpine regions of Lebanon, Antilebanon, and northward.

Fig. 17



Pod of Barbarea Mior.

6. ARABIS, L. Rock-Cress.

Calyx erect, base equal, or bisaccate. Petals clawed. Stigma undivided, or retuse. Pod sessile, elongated, linear ; valves flattened, or convex, 1-nerved. Seeds in one row, rarely in 2 — Herbs with white, pinkish-purple, rarely yellow flowers, and undivided leaves.

* *Seeds wingless, or nearly so.*

† *Annuals, with branching hairs.*

1. A. verna, L. ⊙ Stem 0.20 m., simple, or sparingly branched. Root-leaves *obovate;* stem-leaves *round-ovate,* with clasping base, all *serrate.* Raceme with few, *purplish* flowers, 0.005 m. long; pedicel shorter than calyx. Pods 0.04 m. long, *nearly erect* — Spring — Sandy places, and fields; Hebron to Lebanon, Antilebanon, Nusairy Mountains, and northward.

2. A. Montbretiana, Boiss. ⊙ Stem 0.15 m. to 0.20, nearly simple. Root-leaves *oblong*; stem-leaves *ovate-oblong,* with sagittate, clasping base; all more or less dentate. Raceme with few, *white* flowers, 0.003 m. long; pedicel a little shorter than calyx. Pods 0.04 m. long, *spreading* — Spring — Lebanon, Antilebanon, Nusairy Mountains, and northward.

3. A. auriculata, Lam. ⊙ Stem somewhat branched, 0.30 m. Root-leaves oblong; stem-leaves ovate-oblong, with sagittate, clasping base; all denticulate. Raceme with somewhat numerous, *minute, white* flowers. Pedicel *longer than calyx.* Fruiting raceme zigzag. Pods 0.05 m. long, less than 0.001 broad, spreading — Spring — Gilead, Haurân, Antilebanon, Lebanon, and northward.

4. A. Aucheri, Boiss. ⊙ *Villous.* Stem nearly simple, 0.35 m. Root-leaves *ovate;* stem-leaves *oblong,* and *oblong-ovate, not clasping at base;* all denticulate. Racemes with few, *white* flowers, 0.005 m. long. Pods 0.03 m. to 0.04 long, 0.001 broad, *erect* — Spring — Sandy fields; Damascus to Aintab, and northward.

† † *Biennials, glaucous, or hirsute.*

5. A. perfoliata, Lam. ② Glaucous. Stem 0.60 m. to 1 m. Root-leaves runcinate-dentate, hirsute with branching hairs; stem-leaves oblong-lanceolate, cordate-sagittate at base, denticulate, or entire. Petals *pale cream-colored.* Pods stiff, 6-8 times as long as pedicel; seeds in 2 rows — Spring — Qodmûs in Nusairy Mountains, and northward.

6. A. laxa, Sibth. and Sm. ② Glaucous. Stem 0.60 m. to 0.80. Root-leaves *lyrate,* obtuse, hirsute with branching hairs; stem-leaves oblong, acute, cordate-auriculate, entire. Petals *white.* Pods 0.12 m. long, 0.0015 broad, along one side of stem, *spreading* — April to July — Shady places; middle region of Mt. Cassius.

Var. **cremocarpa,** Boiss. Pods *deflexed,* 0.10 m. to 0.13 long — Bikfaya, Hammana, and mountain above Batroun.

7. A. sagittata, Bertol. ② Hirsute. Stem, simple, 0.60 m. Root-leaves oblong, petioled, dentate; stem-leaves *erect, oblong, obscurely dentate,* with spreading auricles. Pods *erect,* torulose, 0.05 m. long, 0.001 broad — May and June — Middle region of Lebanon, and northward.

† † † *Perennials.*

8. A. albida, Stev. ♃ Canescent, or woolly. Stem 0.20, simple, or slightly branched. Root-leaves obovate-oblong, obtuse; stem-leaves

ovate, clasping, sparingly toothed. Petals white, showy, 0.015 long. Pods 0.04 long, 0.0014 broad, torulose, erect, or somewhat spreading — April to September — Rocks ; alpine and subalpine Lebanon, and Antilebanon, and northward.

Var. **umbrosa,** Boiss. Green, *slender*, zigzag. Stem-leaves *oblong*, or *oblong-lanceolate* — Shady places.

Var. **thyrsoidea,** Boiss. Green, *low*, 0.05 to 0.10. Leaves small, obovate, few-toothed. Racemes dense. Pods 0.025 long — Dhohr-el-Qodhîb.

Var. **brevifolia,** Boiss. Felty-canescent. Stems *tufted*, brittle. Leaves small, few-toothed — Exposed places.

Var. **Billardieri,** Boiss. Woolly-canescent. Stems *more loosely tufted than in last.* Leaves smaller, entire, or 1-2-toothed at base. Pods 0.02 to 0.05 long — Shady places.

* * *Seeds broadly winged. Biennials.*

9. A. turrita, L. ② Puberulent, with branching hairs. Stem 0.50 erect, nearly simple. Root-leaves 0.10 m. long, elliptical, tapering into a petiole ; stem-leaves oblong, obtusely cordate-clasping ; all denticulate. Pods (Fig. 14, *c.*) 0.12 long, 0.002 broad, recurved, on erect, very short pedicels — May to August — Woods ; Amanus.

7. CARDAMINE, L. Bitter-Cress.

Calyx equal at base, upright, or spreading. Petals clawed. Pods linear, flattened ; nerves 0. Stigma simple — Annual, or perennial herbs, with pinnate leaves, and white flowers.

1. C. hirsuta, L. ⊙ Small Bitter Cress. Leaflets 2-4 pairs. Flowers 0.003 long, *much overtopped by young pods.* Pods 0.02 long, 0.001 broad, erect — February to May — Fields and shady places ; common.

2. C. uliginosa, MB. ♃ Leaflets 2-7 pairs. Flowers 0.006 long, *overtopping the young pods.* Pods 0.03 long, 0.001 broad, somewhat spreading — May to August — Wet places ; Lebanon, and northward.

8. MORETTIA, DC.

Calyx erect, equal at base. Petals oblong linear, entire, pink. Pods short, terete; stigma thickened at base, bifid. Valves with small partitions on their inner surface — Perennial, branching, prostrate, or ascending, stellate-canescent, desert herbs.

M. canescens, Boiss. ♃ *Rahhmî.* Leaves short-petioled, ovate-oblong, entire, or obsoletely toothed, 0.01 to 0.015 long, Pods 0.01 long, nearly erect — February to May — East of Gilead to El-'Arabah, and Et-Tîh, and southward.

9. ANDREOSKIA, Reichenb.

Calyx erect, nearly equal at base. Petals small, oblong, white. Pods linear, indehiscent, flattened, valves ending in divergent horns,

half, or more than half as long as style — Annual herbs, with habit of Cardamine.

A. Cardamine, R'c'h'b. ⊙ Glabrous, 0.6. Base of petiole with *large, semi-orbicular auricle;* leaflets 4-5 pairs, ovate-oblong, obtusely crenate. Pods 0.02 long, 0.002 broad — Spring — Moist places, Tripoli and northward.

10. NOTOCERAS, R. Br.

Calyx somewhat spreading, equal at base. Petals minute, white. Pods short, somewhat dehiscent ; valves keeled, honeycombed on their inner face, ending in a divergent mucro, longer than style; stigma capitate — Dwarf, desert annuals, canescent with bipartite hairs.

N. Canariense, R. Br. ⊙ 0.05 to 0.10, ascending. Leaves oblong-linear, tapering at base, 0.02 long. Pods 0.01 long, 0.0015 broad ; mucro 0.001 long — March and April — Mar Saba, Jericho, and eastward, and southward.

11. ANASTATICA, L. Rose of Jericho.

Calyx erect, equal at base. Petals minute, white. Pod ovate-globose, inflated, 2-celled, dehiscent. Valves with a transverse auricle at apex, divided within by a transverse partition into two compartments ; seeds solitary in each compartment, pendulous. Style awl-shaped ; stigma indistinct — Dwarf, dichotomous, prostrate annuals. Fruiting plant indurated. woody, with branches incurved, forming a globe, which expands again when immersed in water. Fruit persistent.

A. Hierochuntina, L. ⊙ Stellate-canescent. Leaves obovate, repand, tapering, into a short petiole — February to May — Around Dead Sea, along borders of Et-Tîh, and southward.

12. HESPERIS, L. Rocket.

Calyx erect, bisaccate at base. Petals clawed. Pods elongated, terete, usually tardily dehiscent, sometimes breaking into irregular joints. Septum with narrow, transverse areolæ — Perennial, or biennial herbs, with purple, violet, or livid flowers.

* *Flowers purple, or violet. Biennials or perennials.*

1. H. Kotschyana, Fenzl. ♃ 0.30 to 0.40. Canescent with loose branching hairs. Stems *nearly simple.* Root-leaves oblong-lanceolate, coarsely dentate ; stem-leaves lanceolate, acute, denticulate. Petals pale violet. Pods rigid, *glabrous,* 0.05 to 0.06 long, 0.001 broad — May to July — Subalpine regions of Lebanon, and Cassius, and northward.

2. H. matronalis, L. ② 0.80 to 1. More or less pubescent with coarse, branching hairs. Stems *paniculate.* Leaves ovate-lanceolate, acuminate, dentate. Petals light purple. Pods erect-spreading, rough, *flexuous,* 0.10 long, 0.0015 broad — June and July.

Var. **runcinata,** Boiss. Glandular, with intermixture of spreading hairs. *Lower leaves often lyrate* — Nusairy Mountains. Subalpine regions of Amanus, and northward.

* * *Petals livid. Perennials.*

3. H. pulmonarioides, Boiss. ♃ 0.30, simple or branching at base, minutely glandular-woolly. with intermixture of scattered bristles. Root-leaves oblong-spathulate ; stem-leaves tapering to a margined petiole, or sessile, more or less clasping, triangular-oblong, or oblong-lanceolate, more or less acute ; all entire or obsoletely denticulate. Pedicels *longer than calyx*, recurved in fruit. Pods *glabrous*, 4-*angled*, as broad as thickened pedicel, 0.10 to 0.13 long — April and May — Blûdan to Aleppo, Aintab, and eastward.

4. H. secundiflora, Boiss. et Sprun. ♃ More or less hispid with spreading bristles. Lower leaves wavy-pinnatifid ; stem-leaves sessile, oblong-lanceolate, dentate at base. Racemes somewhat one-sided. Pedicels *shorter than calyx*. Pods spreading, glabrous, or rough, *flattened*, *very long*, subtorulose — Early Spring -- Said by Paine to have been found in Gilead and Moab ; not found by others ; perhaps the following.

5. H. pendula, DC. ♃ Minutely glandular-woolly, with intermixture of scattered bristles. Root-leaves runcinate-lyrate ; stem-leaves sessile, triangular-lanceolate, acutely dentate. Racemes loose. Pedicels shorter than calyx. Pods 0.06 to 0.08 long, 0.003 broad, *terete*, *hirsute with branching hairs*, sub-torulose, *pendulous* -- April to June — Rocky places and woods ; Gilead and Moab, Lebanon above 1,500 m., Antilebanon, plain of Damascus, and northward.

13. MALCOLMIA, R. Br.

Calyx erect, equal, or bisaccate at base. Petals clawed. Pods elongated, terete, often tardily dehiscent, tapering into a capitate or conical stigma, formed by two connivent lamellæ — Annual herbs, with pink, white, or yellow flowers.

* *Calyx bisaccate. Pod soon dehiscent. Style apiculate. Stigma capitate.*

1. M. confusa, Boiss. ⊙ 0.10 to 0.015, ashy stellate-puberulent. Leaves small, oblong or oblong-linear, or somewhat repand. Petals 0.003 long, pale. Pods 0.02 long, 0.001 broad, torulose, *puberulent ;* stigma truncate, bilobed — March and April — Sands along Phœnicean coast

2. M. pulchella, DC. 0.05 to 0.10, many-stemmed, diffuse, ascending, glabrous, or sparingly appressed-pubescent below. Leaves obovate to oblong, entire, repand, or more or less sinuate-pinnatifid. Petals 0.01 long, pale-pink. Pods 0.03 to 0.04 long, 0.001 broad, *glabrous ;* stigma truncate, or bilobed — January to April — Sandy places ; borders of Et-Tîh, and northward along coast.

Var. **pygmæa,** Post. More or less *stellate-canescent* below. Leaves *small, sinuate-toothed or pinnatifid.* Flowers smaller, pale — Borders of Et-Tîh, and southward. (*M. pygmæa, Del.*)

* * *Calyx nearly equal at base. Pods tardily dehiscent, gradually tapering into an acute or obtuse stigma.*

3. M. Africana, L. ⊙ 0.30, pubescent, with scattered, single and forked hairs. Leaves oblong, *dentate, or repand-toothed.* Flowers 0.005 long, white. Pods 4-*angled*, spreading, scabrous, 0.06 long, 0.0015 broad — Spring — Sandy places; Et-Tîh, Dead Sea, and Moab, to Damascus, Aleppo, and northward, and eastward.

4. M. torulosa, Desf. ⊙ 0.25, sparingly pubescent, or hispid, with branching hairs, and bristles. Leaves oblong, acutely dentate *or pectinate-pinnatifid.* Flowers 0.002 long, white. Pods *terete*, hirsute, torulose, 0.03 to 0.04 long, 0.001 broad — March to May — Fields and waste places, throughout, and southward through the Tîh, to Egypt. Var. **contortuplicata,** Boiss., with twisted and coiled pods, occurs with type.

Var. **leiocarpa,** Boiss. Pods glabrous. Leaves generally scarcely dentate — Palmyra, Haurân, and Gaza.

5. M. Auranitica, Post. ⊙ 0.10, sparingly *glandular-puberulent,* except lower surface of rachis of leaves, which is *villous with branching hairs.* Leaves linear-lanceolate, *runcinate.* Raceme few-flowered ; flowers 0.012 long, *pink ;* sepals green, *very sparingly papillose*, scarious-margined, obtuse ; lamina of petals obovate-oblong, as long as calyx. Pedicel half as long as calyx. Young pods very sparingly papillose-hairy — May — In wheat field, east of Sowarat-es-Saghiri, Haurân. *Root-leaves* 0.04 *long*, 0.008 *broad, rosetted.*

6. M. Zachlensis, Post.⊙ 0.10 to 0.15. Sparingly pubescent or hispid. Stems single, erect. Leaves oblong-linear, *pectinate-pinnatifid.* Raceme few-flowered ; flowers 0.01 long, *pink ;* sepals hispid with branching wavy hairs, acutish, scarious-margined ; lamina of petals obovate-oblong. Pedicels half as long as calyx. Pods . . . . — April and May — Zahleh. *Root-leaves* 0.03 *to* 0.06 *long*, 0.005 *broad, rosetted.*

* * * *Calyx bisaccate. Pods tardily dehiscent, gradually tapering into a style. Septum areolate, rarely fungous.*

† *Flowers pink.*

7. M. Chia, Lam. ⊙ 0.10 to 0.20, canescent, with appressed bipartite hairs, branching. Leaves *entire, obovate to oblong, tapering to a petiole.* Flowers 0.008 long. Pods 0.05 to 0.06 long, 0.001 broad, nearly erect, *puberulent ;* style conical — April to June — Rocky places; Hebron to Phœnicean coast, Lebanon, Antilebanon, Damascus, and northward.

8. M. crenulata, DC. ⊙ 0.10 to 0.20, green, scabrous, or glabrescent ; stems numerous, simple. Leaves *crenulate-repand*, lower oblong, tapering to a petiole, upper *sessile, clasping*, oblong-lanceolate, *long-auricled.* Flowers 0.015 long. Pods 0.08 to 0.12 long, 0.0025 broad, spreading, *glabrous* or sparingly papillose-hairy ; style bifid — January to May — Deserted fields ; southern Palestine and Moab to Aintab.

† † *Flowers yellow.*

9. M. conringioides, Boiss. ⊙ 0.05 to 0.10, green, scabrous-papillose ; stems simple. Root-leaves obovate-oblong, tapering at base, *repand, or entire ;* stem-leaves *short auricled, acutely denticulate.* Flowers 0.012 long. Pods 0.06 to 0.09 long, 0.0015 broad, horizontal, glabrous ; style terete, slightly bifid — April to June — Fields and rocks ; Damascus, Antilebanon to 1,500, and Zahleh, to southern Palestine.

14. EREMOBIUM, Boiss.

Calyx erect, long persistent, bisaccate. Petals linear-spathulate, entire, pinkish. Pods linear, torulose. Seeds nearly orbicular, margined. Cotyledons obliquely accumbent — Annual herbs, canescent with stellate hairs, or glabrescent.

1. E. lineare, Del. ⊙ Prostrate, or ascending, branching, *compact*, 0.10 to 0.30. Leaves sessile, oblong, or oblong-linear, entire. Racemes *dense, many-flowered ;* flowers 0.005 long, overtopped by young pods (as in Cardamine hirsuta) ; *pedicels half as long as calyx, or less.* Fruiting raceme *compact.* Pods 0.015 long, 0.001 broad, stellate-canescent, 6-18-seeded — February to May — Sandy places ; in the Tîh and southward.

Fig. 18



Fig. 18. (*a*) Fruiting raceme of E. lineare, Del. (*b*) Fruiting raceme of E. Fieldii, Post. (*c*) Pod of E. Fieldii.

2. E. Fieldii, Post. ⊙ Prostrate, branching, *straggling ;* stems 0.10 to 0.20 long. Leaves sessile, *oblong-linear, linear,* or *cylindrical, fleshy.* Racemes *loose, few-flowered ;* flowers 0.01 long, not overtopped by pods ; *pedicels nearly as long as calyx.* Fruiting raceme *elongated, loose.* Pods 0.015 to 0.025 long, 0.002 broad, puberulent or *glabrescent,* 4-8-seeded ; *seeds twice as broad as in last* — February to April — Sandy places ; Et-Tîh, and southward.

15. SISYMBRIUM, All. Ped. Hedge-Mustard.

Calyx erect, or spreading, generally equal at base. Petals clawed. Pods flattened or terete, 4-6-sided ; stigma capitate, or obsoletely bi-lobed — Annual or biennial herbs with yellow, white, or pink flowers.

* *Flowers* 0.002 *long, cream-colored, or white. Pods flattene*d, 1-*nerved.*

1. S. pumilum, Steph. ⊙ 0.02 to 0 30, scabrous with short, branching hairs. Root-leaves obovate-oblong, sinuate-dentate, or pinnatifid ; stem-leaves oblong, *sagittate, entire.* Flowers *cream-colored.* Pods 0.015 to 0.03 long, 0.001 broad, spreading, *short-pedicelled,* incurved, *puberulent, longitudinally veined* — Spring — Aleppo, Damascus, and walls of Jerusalem, to Arabia Petræa, and eastward.

2. S. Thalianum, L. ⊙ Mouse-ear Cress. 0.30, sparingly pilose, with simple, or branching hairs. Root-leaves rosetted, oblong, tapering to a petiole ; stem-leaves linear-oblong, sessile ; all *remotely denticulate.* Flowers *white.* Pods 0.015 to 0.02 long, 0.001 broad, spreading, *long pedicelled* (0.012), straight, or incurved, *glabrous* — Spring — Bikfaya, Lebanon ; Husn Suleimân, Nusairy Mountains.

3. S. nudum, Bélang. ⊙ 0.05 to 0.12. Leaves *all radical, minute;* oblong, entire, or somewhat dentate. Flowers *cream-colored.* Pods 0.02 to 0.03 long, 0.001 broad, *short pedicelled, erect* — Spring.

Var. **brachycarpum,** Boiss. Pods 0.015 to 0.02 long. Valves longitudinally veined — Lebanon.

** *Flowers* 0.003 *long, pink. Pods cylindrical,* 1-*nerved.*

4. S. Schimperi, Boiss. ⊙ 0.08, ashy-puberulent. Leaves bipinnatisect, with small oblong, obtuse lobes. Raceme few-flowered. Pods 0.04 long, 0.001 broad, short-pedicelled, spreading, *somewhat recurved, stellate-puberulent* — Spring — Moab (*Tristram*), Sinai, and eastward.

*** *Flowers* 0.003 *long, yellow. Pods cylindrical,* 1-*nerved.*

5. S. Sophia, L. ⊙ 0.40 to 1, ashy-puberulent or glabrous. Stem branching. Leaves *bi-tri-pinnatisect, into minute oblong-linear, acute lobes.* Racemes many-flowered. Pods 0.02 to 0.04 long, 0.001 broad, erect-spreading, glabrous ; pedicels 0.01 long — April to June — Roadsides and waste places ; common throughout.

**** *Flowers from* 0.002 *to*0.014 *long, yellow. Pods terete,* 3-*nerved.*

† *Fruiting pedicel very short, as thick as pod. Septum thick.*

6. S. Columnæ, Jacq. ② 0.30. to 0.50, more or less loosely hirsute. Leaves runcinate-pinnatipartite ; lobes of lower leaves *ovate-oblong,* dentate, *with an ascending auricle at base ; lobes of upper leaves linear or lanceolate, terminal hastate.* Flowers 0.006 long ; calyx *erect.* Pods 0.09 long, 0.0015 broad, horizontal, *sparingly hirsute* or glabrescent — May to July — Fields and roadsides ; Lebanon, Antilebanon, and Gilead to Damascus, Hums, Aintab, and northward.

7. S. Pannonicum, Jacq. 0.30 to 0.50, more or less loosely hirsute below. Lower leaves runcinate-pinnatipartite ; lobes *oblong-*

linear, dentate, with an *ascending auricle at base ;* upper leaves *pinnate, with linear leaflets.* Flowers nearly 0.01 long ; calyx *spreading.* Pods 0.09 long, 0.0015 broad, spreading, glabrous — May and June — Tripoli, Buqa', and Damascus, to Aleppo, and northward, and eastward.

Var. **rigidulum,** Boiss. *Salihh.* 0.15 to 0.20. Lobes of upper leaves short — Sinai, and perhaps Et-Tîh.

8. S. erysimoides, Desf. ⊙ *Thuwwât.* 0.15 to 0.30, nearly glabrous. Leaves runcinate-pinnatifid, lobes *oblong*, dentate, *not auricled at base* Flowers 0.002 long ; calyx somewhat spreading. Pods 0.02 to 0.035 long, 0.001 broad, horizontal, glabrous—Spring—Jericho, Ghor es Safieh, and southward.

† † *Fruiting pedicels somewhat lengthened, slender. Septum thin.*

9. S. Irio, L. ② 0.60, glabrous. Leaves runcinate-pinnatisect ; lobes oblong-lanceolate, toothed, not auricled. Flowers 0.003 long. Pods 0.05 long, 0.001 broad, erect-spreading, *four to five times as long as pedicels* -- March to June — Road sides and waste places ; everywhere.

10. S. Damascenum, Boiss. et Gaill. ② 0.40 to 0.60, hirsute, with spreading and retrose hairs. Lower leaves lyrate-runcinate ; lobes somewhat dentate, *the lower minutely auricled at lower edge.* Flowers 0.005 long. Pods 0.05 to 0.06 long, erect spreading, *six to eight times as long as* pedicel—May and June—Subalpine Lebanon; Wadi el Qarn, Antilebanon ; Damascus.

11. S. Læselii, L. ② 0.40, hirsute with spreading and retrorse hairs, or glabrescent. Leaves runcinate ; lobes oblong-lanceolate or linear, acutely cut or dentate, not auricled. Flowers 0.014 long, *showy.* Pods somewhat curved, nearly erect, *thrice as long as slender pedicel ; stigma bilobed* — May and June — Aintab and northward, and eastward.

* * * * * *Flowers* 0.003 *long, yellow. Pods awl-shaped. Septum thin.*

12. S. officinale, L. ⊙ 0.40, retrorsely hairy, or glabrescent. Leaves runcinate ; lobes 2-6 pairs, those of lower leaves ovate-oblong, the terminal truncate, those of upper linear lanceolate. Pods 0.015 long, 0.0015 broad at base, appressed to stem — Spring — Waste places ; everywhere.

* * * * * * *Flowers* 0.002 *long, cream-colored, bracteate. Pods terete.*

Septum spongy.

13. S. runcinatum, Lag. ⊙ 0.30, nearly glabrous. Leaves acutely runcinate dentate. Flowers *solitary.* Pods hardly 0.02 long, 0.0014 broad, *somewhat incurved* — April to June — Et-Tîh to Haurân, Damascus, Aleppo, and northward.

Var. **villosum,** Boiss. Pubescent throughout — Jebel Qaisûn, Damascus.

16. ALLIARIA, Adans. Garlic-Mustard.

Calyx erect. Petals clawed, white. Pods terete, with 3-nerved valves ; septum pellucid; seeds striate — Biennial herbs, with cordate-ovate leaves, formerly attributed to Sisymbrium, from which they differ in habit.

A. officinale, DC. ⊙ 1, somewhat villous at base, glabrous above. Lower leaves *reniform,* repand-crenate, upper cordate-ovate, acutely dentate. Pods .05 long, .002 broad, with short, thickened pedicel — April to June — Shady places ; Mount Cassius, and northward.

17. CONRINGIA, R'c'h'b.

Calyx erect, bisaccate. Petals clawed. Pods linear, flattened, or acutely 4-angled ; valves 1-nerved — Annual, glaucous herbs, with oblong, or elliptical, entire, auricled, clasping stem-leaves, and racemed yellow flowers.

1. C. Orientalis, L. ⊙ .6. Leaves oblong, wavy-margined. Pods .12 long, .002 broad, spreading, 4-angled ; valves somewhat keeled ; *style tapering ;* stigma minute, capitate, retuse ; seeds rough — February to May — Fields ; Phœnicean coast to Antilebanon, and northward.

2. C. clavata, Boiss. ⊙ .1 to .25. Leaves elliptical. Pods .06 long, .0015 broad, valves obsoletely 1-nerved ; *style club-shaped, quadrangled* ; stigma bifid with connivent lobes ; seeds glabrous — May and June — Fields ; Buqa' and Antilebanon to Antioch, Aintab, and northward.

18. ERYSIMUM, L. Treacle-Mustard.

Calyx erect, equal at base, or bisaccate. Petals clawed. Pods 4-angled, terete, or flattened, valves 1-nerved or keeled ; stigma capitate, retuse, or 2-lobed — Annual, biennial, or perennial herbs, canescent with appressed, simple, bifid, or branching hairs. Flowers yellow, or purple.

* *Annuals. Flowers yellow. Pods 4-angled.*

1. E. repandum, L. ⊙ .15 to .3 green. Leaves linear, or linear-lanceolate, repand-dentate, *often recurved at apex. Pedicels short.* Flowers .008 long. Pods .04 to .09 long, .0015 broad, rough-hairy, spreading, rigid, often torulose ; style thick ; *stigma retuse* — April to June — Fields ; Moab and Gilead to Lebanon, Antilebanon, Aleppo, and northward, and eastward. A variable species.

Fig. 19.

Pod of Erysimum repandum.

Var. **rigidum,** Boiss. Low rigid. Pods somewhat thicker — Same range as type.

2. E. tenellum, DC. ⊙ Low, green, stem branching. Leaves linear, long, repand-dentate. Flowers (size of E. Helveticum) nearly sessile. Pods canescent ; *stigma with long divergent lobes* — Spring — Between Aleppo and Mosul.

* * *Biennials. Flowers yellow. Pods 4-angled, or terete.*

† *Pods 4-angled.*

3. E. Smyrnæum, Boiss. et Bal. ② Green, stems leafy, *paniculate above.* Lower leaves oblong, *runcinate,* or dentate ; upper linear, dentate or entire. Pedicels a little shorter than calyx. Flowers about .01 long. Pods .04 to .08 long, erect-spreading, *clothed with bipartite intermixed with a few branching hairs, tapering into a style nearly as long as their breadth ;* stigma truncate — Spring — Rasheiyah.

4. E. verrucosum, Boiss. et Gaill. ② .4, greenish ; stems angular-striate, leafy, *branching at base and apex.* Leaves oblong, obtuse, *repand-dentate,* tapering at base. Flowers .01 long ; pedicel half as long as calyx. Pods .04 to .05 long, erect-spreading, thick, rigid, *rough with 2-3-4-branching wool, and warts ;* stigma *sessile, truncate* — Spring — Western slopes of Antilebanon.

Var. **leptocarpum,** Boiss. Pods more slender, *with less prominent warts* — Amanus to Aintab and Marash, and northward.

5. E. scabrum, DC. ② .2 to .8, canescent, branching from base ; stems simple, erect. Root-leaves oblong, subdentate, tapering into a petiole ; stem-leaves linear-lanceolate, acute, denticulate, or entire. Flowers .008 long. Pods .02 to .03 long, .0015 broad, *erect,* or somewhat spreading, *minutely tubercled, and pubescent ;* style *filiform,* .002 long — Summer — Mountains of Gilead ; Lebanon 1,000 to 3,000 ; Amanus.

Var. **adpressum.** Pods *appressed to stem,* slender — Mountain above el Me'âsir, Lebanon. Gesbel Dagh, Amanus.

† † *Pods terete, obscurely 4-angled.*

6. E. goniocaulon, Boiss. ② .2 to .7, greenish ; hairs of stem and branches bipartite, of leaves usually stellate. Several-stemmed from neck ; stems simple or paniculate, *acutely angled.* Root leaves tapering to a long petiole, oblong, or lanceolate, denticulate, or entire. Flowers .01 long ; pedicel shorter than calyx. Pods .025 to .04 long, .0015 broad, *terete* sub-quadrangular, *curved or twisted, densely stellate-woolly ;* style slender, .001 to .002 long — April to June — Rocky places ; Lebanon above 1,200, Cassius, Amanus, and northward.

Var. **brachycarpum,** Boiss. Robust. Pods .012 to .02 long, more 4-angled than in type — Fim-ul-Mîzâb ; Cassius.

Var. **minus,** Boiss. .15 to .3. Root-leaves dentate, stem-leaves entire, or obscurely denticulate — Lebanon and Antilebanon.

* * * *Perennials. Flowers yellow or purple. Pods 4-angled.*

7. E. crassipes, C. A. M. ♃ .3 to .6 canescent ; stems numerous, slender, rigid. Leaves narrowly linear, entire. Flowers *yellow*, .008 long, nearly sessile. Pods .05 long, .001 broad, spreading, rigid, on short, thick-pedicels ; style less than .001 long, *cylindrical ;* stigma retuse — March to June — Stony places in mountains, throughout.

8. E. hamosum, Blanche (*In herbario*). ♃ .4 to .6, canescent, scabrous with bipartite hairs. Stems erect, simple or slightly branched above. Root-leaves narrowly linear. Stem-leaves somewhat broader, all entire. Flowers .008 long, pale yellow ?, nearly sessile. Pods .015 to .02 long, .0015 broad, or thick short pedicels, terete or somewhat flattened, *recurved, hook-shaped, with a thread-like style*, .005 long ; stigma obscurely bifid — May — Jebel-el-Abiadh, between Hamath and Palmyra.

9. E. purpureum, Auch. ♃ .25, canescent ; trunk *procumbent, shrubby ;* stems herbaceous, ascending. Leaves linear, lower *runcinate-pinnatifid*, upper *dentate*, or entire. Flowers *pinkish-purple*, .01 to .012 long, short pedicelled. Pods .05 long, .001 broad, spreading, on short, thick pedicels; style .002 long, *tapering ;* stigma *bilobed* — April to June — Middle and subalpine zones of Lebanon, and Antilebanon.

19. BRASSICA, L.

Calyx equal at base. Petals clawed. Pod linear-cylindrical, terete, or somewhat flattened, or 4-sided; valves 1-nerved, with anastomosing veins — Herbs or shrubs with yellow flowers.

* *Pods terete, cylindrical, or linear-flattened. Beak seedless.*

1. B. nigra, L. ⊙ Black Mustard. *Khardal Aswad.* .6 to 1, or taller, *sparingly hairy.* Leaves petiolate ; the lower lyrate, or dentate-lobed, or serrate ; the upper lanceolate, entire. *Racemes naked.* Pods more or less appressed, .01 to .02 long, .0015 to .002 broad, terete, nearly 4-angled. Seeds *blackish, pitted* — April to June — Roadsides and waste places ; everywhere.

2. B. bracteolata, F. et M. ⊙ *Glabrous.* Leaves petioled ; lower lyrate, with 1-2 small, lateral segments, terminal large, oblong, irregularly lobed at base ; upper oblong-linear, entire. *Racemes sometimes leafy.* Pods .02 long, .002 broad ; beak .004 long — Spring — Moab (*Tristram*).

3. B. rapa, L. ② Turnip. *Lift. Suljum.* .6, green. Root-leaves more or less scabrous, lyrate ; upper acuminate, cordate-clasping at base. Racemes clustered before flowering. Pods .02 to .03 long, .0015 to .002 broad ; beak .008 to .01 long — Spring — Fields ; common ; often escaped from cultivation.

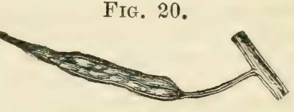
4. B. lasiocalycinum, Boiss. et Haussk. ⊙ .45 to .75, sparingly hairy below. Lower-leaves lyrate, with acute, denticulate lobes ; upper lanceolate, acutely dentate. Flowers long-pedicelled (larger than those of Sinapis arvensis). Young pods spreading ; style cylindrical — Gardens ; Aleppo. An imperfectly known species (*Erucastrum lasiocalycinum, Boiss. et Haussk*).

* * *Pods cylindrical, somewhat flattened. Beak seed-bearing at base.*

5. B. deflexa, Boiss. ⊙ .6 and taller, *hispid*. Lower-leaves oblong-lanceolate, *irregularly dentate-lobed*, upper linear-lanceolate, denticulate or entire. Calyx *woolly-canescent*. Pods .05 to .06 long, .0015 broad, torulose ; style thick, .002 long — May and June — Buqa' and Antilebanon to Aleppo, and eastward.

6. B. Tournefortii, Gou. ⊙ .5, *somewhat papillose-hairy below*. Root-leaves rosetted, *runcinate-lyrate*, with dentate segments ; *stem-leaves few*, small, linear, denticulate, or entire. Pods .02 to .05 long (without beak), .002 broad ; beak .01 to .015 long, tapering — March to May — Sandy places ; maritime plain.

FIG. 20.



Pod of Brassica Tournefortii.

7. B. adpressa, Mœnch. ⊙ 1 or more, *sparingly papillose-reflexed-hairy* below, glabrous above. Root-leaves lyrate, segments dentate ; stem-leaves few, oblong-linear, denticulate, or entire. Pods *appressed*, .005 to .01 long (without style), .001 broad ; style *geniculate, rarely* straight, .005 long, *thicker than pod* — March to May — Fields and road sides ; common. (*Hirschfeldia adpressa, Mœnch.*)

N.B.—To this genus belong *B. oleracea*, L., *Cabbage*, with its many cultivated varieties, as *Broccoli*, *Cauliflower*, *Kale*, and *Kohl-rabi ;* also *B. Napus*, L., *Rapeseed* with its varieties.

20. SINAPIS, L. Mustard. *Khardal.*

Scarcely distinguished from Brassica by the 3-nerved valves of pods.

* *Pods with conical beak.*

1. S. juncea, L. ⊙ *Glabrous*. Lower leaver oblong-lanceolate dentate sometimes lyrate, upper *lanceolate-linear*, entire or dentate. Pods rather erect, torulose ; beak long, awl-shaped at apex ; valves keeled — Spring — Jericho. Cultivated for oil.

2. S. arvensis, L. ⊙ Field Mustard. Charlock. *Khardal barri*. .6 to 1, *more or less hirsute*. Leaves *ovate*, unequally dentate, radical sometimes lyrate. Pods .03 to .05 long, .002 broad, erect, or slightly spreading ; beak often as long as rest of pod — Spring — Fields and waste places ; common.

FIG. 21.

Pod of S. arvensis, type.

Var. **genuina.** Pods as above, glabrous -- everywhere.

Var. **Mesopotamica,** Boiss. Pods .02 to .03 long -- Beirût.

Var. **Orientalis,** Boiss. Pods retrorsely hispid — Common.

* * *Pods with long, ensiform, flattened beak.*

3. S. alba, L. ⊙ White Mustard. *Khardal abiadh.* 1 and higher, hispid. Leaves puberulent, pinnatisect, with unequally dentate-lobed segments. Pods .03 long, .004 broad, torulose, generally hirsute ; beak seed-bearing at base, decurrent — Spring — Waste places ; everywhere.

Fig. 22.



Pod of Sinapis alba.

21. DIPLOTAXIS, DC.

Calyx spreading, equal at base. Petals clawed. Pods linear, flattened ; valves 1-nerved. Seeds in 2 rows — Erect, branching herbs, with yellow, pink, or white flowers, and aspect of Brassica.

* *Flowers yellow.*

1. D. tenuifolia, L. ♃ .6, *glabrous.* Leaves oblong-lanceolate, sinuate-dentate, or pinnately cut or parted, with linear lobes ; rarely entire. Pedicels *twice as long as flowers.* Pods *erect on ascending pedicels,* .04 long, .002 broad ; style .003 long — June to November -- Walls and roadsides.

Var. **integrifolia,** Boiss. Nearly all the leaves entire — Castle of Antioch.

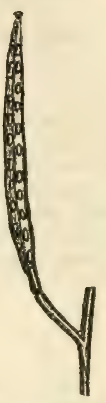
2. D. viminea, L. ⊙ *Jureijîr.* .3, *sparingly-papillose-hairy ;* stems simple, or branched at base. Root-leaves sinuate-lyrate, with short, obtuse lobes ; stem-leaves few, oblong, or linear, dentate. Pedicels *shorter than flowers.* Pods *ascending,* .02 to .03 long, .0018 broad ; style .003 long — November to May — Roadsides ; common.

Var. **integrifolia,** Boiss. Leaves entire, or scarcely crenate — Coast, Jerusalem, and probably elsewhere.

Var. **foliosa,** Post Stems leafy. Leaves oblong-lanceolate, irregularly dentate — Plain of Sharon.

3. D. Harra, Forsk. ♃ *Harra.* .2 to .4, hispid, rarely glabrescent ; stems multiple, branching, often woody at base. Leaves obovate-oblong, coarsely-toothed. Pedicels *longer than flower, slender,* often *deflexed.* Pods *stipitate,* .04 long, .002 broad, *with broad, subsessile, bilobed stigma* — February to May — Sterile places ; Damascus to Ghor-es-Safieh, Et-Tîh, and southward, and eastward.

Var. **glabra,** Post. Glabrous. Leaves oblong, sparingly toothed — Damascus, Antilebanon.


Fig. 23. Pod of D. erucoides.

* * *Flowers lilac-pink, or white.*

4. D. erucoides, L. ⊙ .3 to .6, sparingly papillose-hairy ; stems branched from base and above. Leaves *runcinate-lyrate*, dentate, uppermost oblong, dentate. Pedicels *about as long as flowers.* Pods *ascending*, .02 to .04 long, .002 broad, style .003 long ; *stigma bilobed* — January to April — Fields ; Damascus and Cœlesyria to Moab, Jordan valley, southern Palestine, and southward, and eastward.

5. D. acris, Forsk. ⊙ *Shuqaiyar*. .01, sparingly hairy, or glabrescent. Leaves oblong or obovate, dentate, obtuse. Pedicels ascending, about as long as flower ; flower .013 long, Pods erect, short stipitate, .02 to .035 long, .002 broad ; stigma sessile, truncate — Spring — Et-Tîh, and southward.

22. MORICANDIA, DC.

Calyx erect, bisaccate. Petals clawed. Pod linear, more or less flattened ; valves keeled, 1-3-nerved. Seeds in 1 or 2 rows — Glabrous herbs, with large pinkish-purple flowers.

* *Leaves undivided, the upper cordate-auricled, clasping at base. Pods somewhat 4-angled. Valves 1-nerved. Biennials or perennials.*

1. M. Sinaica, Boiss. ② ♃ *Khusiân-el-Jemâl. Yahaq.* Leaves .06 to .1 long, *obovate* to *ovate*, the lower tapering at base. Pods .05 to .07 long, .002 broad ; seeds in 2 rows — February to May — Et-Tîh and southward.

2. M. dumosa, Boiss. ♄ *Hhamîmah.* .6. Leaves .01 to .02 long, *oblong ;* the lower and those of sterile branches often repand-dentate, ,with cuneate base. Pods .04 to .06 long, .001 broad ; seeds nearly in 1 row — March to May — Et-Tîh and southward, and eastward.

* * *Leaves bipinnatisect. Pods flattened. Valves obsoletely 3-nerved. Annuals.*

3. M. clavata, Boiss. et Reut. ⊙ Fleshy, .1 to .2 ; stem flexuous, branching from base. *Lobes of leaves linear, somewhat terete.* Pods .02 long, .001 broad ; seeds in 2 rows — February to April — Et-Tîh and southward.

23. ERUCA, DC.

Calyx equal at base, erect. Petals veined, clawed, entire or retuse. Pod linear or oblong, appressed, with ensiform style, and convex 1-nerved valves. Seeds in 2 rows, or rarely in 1 — Branching, erect-herbs, with yellow, lilac-veined petals.

1. E. sativa, L. ⊙ .5, more or less papillose-hairy. Leaves lyrate-pinnatifid or pinnatisect into oblong, dentate lobes. Beak *half as long as pod or more* — March to May — Roadsides and fields ; common.

Fig. 24.



Pod of Eruca sativa, type.

Var. **eriocarpa.** Pods scabrous with retrorse hairs (*E. Cappadocica, Boiss., var. eriocarpa*) — Wadi el Qarn, Antilebanon.

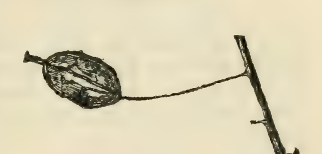
Var. **Cappadocica,** Segments of leaves less toothed. Pod longer, glabrous, beak one-third its length ; seeds larger than in type. (E. Cappadocica, *Boiss.*) -- Between Hamath and Palmyra.

24. SAVIGNYA, DC. El-Qulaiqalah.

Calyx erect, equal. Pod stipitate, elliptical, with chartaceous valves ; septum with 2 layers. Stigma simple. Seeds in 2 rows; winged, with half-adnate funicles — Viscid, glabrous, or sparingly hairy divaricately branched, desert herbs, with small pale pink flowers.

S. Ægyptiaca, DC. *Hhalâwah.* ⊙ .1 to .15. Leaves fleshy, the lower obovate-oblong, dentate, petioled ; upper linear, pinnatifid, or entire. Pods on filiform, spreading pedicels twice their length ; style apiculate — February to April — Et-Tîh and southward.

Fig. 25.



Pod of Savignya Ægyptiaca.

25. CARRICHTERA, DC.

Calyx erect, equal at base. Petals clawed, entire. Pod globular-ovate ; style flattened, spoon-shaped, ovate, leaflike ; cells 4-ovuled — Dwarf annuals, with small cream-colored, violet-veined petals.

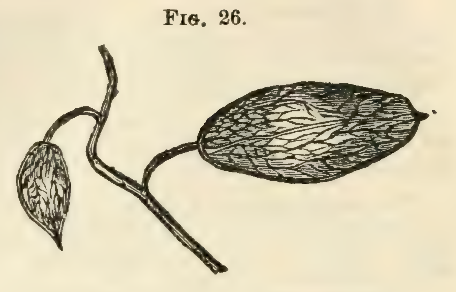
C. vellæ, DC. ⊙ .1 to .3, glabrous, or slightly hairy, dichotomous from base. Leaves bipinnatisect into linear lobes — March to May — Aleppo to Moab, Jerusalem, Et-Tîh, and southward, and eastward.

26. RICOTIA, L.

Calyx bisaccate. Petals clawed, obcordate or retuse. Fruit a flat lenticular or elliptical silicle, 1-celled by disappearance of thin septum, or a linear 2-celled silique with papyraceous septum. Seeds in 1 row, flattened, wingless — Annual, sparingly hairy herbs, with pink or white flowers, and recurved fruiting pedicels.

1. R. Lunaria, L. .2 to .4. Leaves 2-3 pinnate, with petiolulate divisions, and ovate, lobed segments. *Petals obcordate. Silicles lenticular or elliptical,* .03 long, .013 broad, 2-7 seeded, mucronate with short style — Spring — Cœlesyria, Lebanon, and coast to southern Palestine ; Jordan valley.

Fig. 26.



Pods of Ricotia Lunaria in different stages of development.

2. R. sinuata, Boiss. et Held. ⊙ Leaves bipinnatisect, with petiolulate ovate-cuneate, deeply lobed segments, those of upper leaves linear. *Petals retuse. Siliques* .04 to .05 long, .004 broad, 7-8 seeded, *sinuous* contracted between the seeds ; style one-third as long as breadth of pod — Spring — Beilan and northward.

27. FARSETIA, Turra. Jerba'.

Calyx equal at base. Petals clawed, with oblong-linear limb. Silicle canescent (in ours) oblong, ovate, or elliptical ; stigma 2-lobed. Seeds in 2 rows, flattened, broadly winged — Low shrubby canescent plants, with forked hairs, purplish flowers, and linear, entire leaves.

Fig. 27.

F. Ægyptiaca, Turra. ♄ .4. Silicles *oblong* or *elliptical,* .015 to .02 long, .006 broad ; seeds 12 or less — Spring — Around the Dead Sea and southward.

Var. **ovalis,** Post. Lower, more spinescent Silicles *ovate* or elliptical, .01 to .015 long, .006 to .008 broad ; seeds 6 or less — Around the Dead Sea and southward. (*F. ovalis, Boiss.*)



Pod of F. Ægyptiaca.

28. FIBIGIA, Medik.

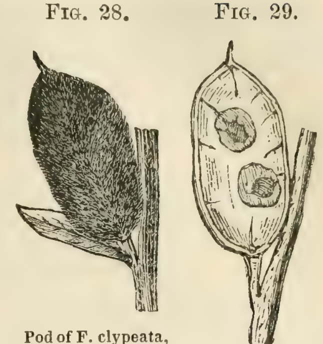
Calyx bisaccate or equal at base. Petals clawed ; limb oblong, entire. Silicles hirsute, elliptical or orbicular, sometimes obovate, flattened, 2-celled ; septum nerveless, with fine transverse veins. Stigma minute, capitate. Seeds in 2 rows, flattened, winged — Perennial herbs or low shrubs tomentose, with stellate hairs. Flowers racemose-spiked (ours) yellow.

F. clypeata, L. ♃ .4 to .8. Root and lower stem-leaves oblong spathulate, upper oblong, or oblong-linear, all entire or repand. Silicles elliptical, ovate-elliptical, to obovate-elliptical ; style apiculate ; seeds 3-8, usually broader than wing — Spring — Rocky places in mountains, throughout.

Var. **rostrata,** Post. Style half or one-third as long as breadth of pod. (*F. rostrata, Schenk.*)

Var. **macroptera,** Post. Wing as broad as or broader than seed. (*F. macroptera, Ky.*)

Fig. 28. Fig. 29.



Pod of F. clypeata,

Pod of F. clypeata with valves removed to show seeds.

Var. **obovata,** Post. Pods obovate. (*F. obovata, Boiss.*)

Var. **eriocarpa,** Post. Pods densely woolly. (*F. eriocarpa, DC.*)

29. AUBRIETIA, Adanson.

Calyx erect, bisaccate Petals clawed, limb entire or retuse. Silicle ovate-oblong ; style apiculate ; valves convex ; septum with 1-2 longitudinal folds, and numerous, transverse, minute areolæ ; seeds in 2-rows, numerous, minute — Tufted, perennial herbs, with short branching wool, and pink or white flowers.

A. Libanotica, Boiss. ♃ .1 to .15, spreading, canescent. Leaves oblong-deltoid, entire or with a tooth at each angle. Fruiting racemes flexuous. Valves nerveless — Summer — Alpine and subalpine regions of Lebanon ; Cœlesyria.

30. COLUTEOCARPUS, Boiss.

Calyx erect, equal at base. Petals clawed, with entire limb. Silicle papyraceous, inflated, ovate, dehiscent only at apex ; style apiculate ; valves reticulate, 1-nerved ; septum marginal, incomplete ; seeds wingless — Perennial, glabrous, tufted herbs, with white flowers and habit of Thlaspi.

C. reticulatus, Lam. ♃ Leaves rigid ; the radical rosetted, tapering at base, linear-oblong, sharply 3-4-dentate on both sides ; stem-leaves entire, ovate or oblong, acute. Raceme before flowering capitate, afterwards somewhat elongated — Summer — Alpine and subalpine Lebanon and Antilebanon ; Jebel Qaisûn, near Damascus.

31. KŒNIGA, Adanson.

Calyx erect, equal. Petals entire, white. Silicle flattened, nearly orbicular ; septum reticulate ; seeds margined — Annual or perennial herbs, canescent with bipartite hairs.

1. K. Lybica, Viv. ⊙ Prostrate. Leaves lanceolate-linear, obtuse. Silicles beset with 2-parted hairs ; cells 4-5 seeded — Spring — Desert of Moab (*Tristram*). Et-Tîh.

2. K. Arabica, Boiss. ⊙ *Dhahhîyân.* Prostrate. Leaver-oblong-spathulate or linear, obtuse, tapering into a petiole. Silicles sparingly hairy ; cells 1-2 seeded — Spring — Borders of Et-Tîh and southward.

To this genus belongs the *Sweet Alyssum*, *K. maritima*, L., which is found sparingly, escaped from gardens.

32. ALYSSUM, L. *Alûsûn.*

Calyx erect, equal at base. Petals entire or retuse, yellow or cream-colored. Silicles obovate, orbicular, elliptical, or lenticular ; cells 1-2 or 4-6 ovuled ; septum nerveless with fine transverse venules — Annual or perennial, stellate-woolly or scurfy herbs.

* *Silicles flattened or convex, cells* 1-*ovuled. Filaments toothed.*

† *Perennials.*

‡ *Low* .1 *to* .3. *Lower-leaves less than* .01 *long. Silicles not over* .004 *long.*

1. A. alpestre, L. ♃ Shrubby at base. Leaves obovate or oblong, the upper often lanceolate-linear. Flowers .002 long ; petals obovate, sometimes retuse. *Fruiting racemes rather long*, dense. Silicles *obovate, to ovate-elliptical*, .002 to .003 long, .0015 to .002 broad, more or less stellate-woolly ; style nearly as long as pod ; seeds wingless — Summer — Alpine and subalpine regions of Lebanon, Antilebanon, Amanus, and northward.

Var. **genuinum,** Boiss. Appressed-canescent ; stems slender, .1 to .2 long, prostrate er ascending, tufted.

Var. **suffruticens,** Boiss. Appressed canescent ; stems ascending, .2 to .3.

Var. **obovatum,** Boiss. As in preceding, but leaves all obovate-spathulate, obtuse.

Var. **minutiflorum,** Boiss. Scurfy. Summit of Sunnîn.

2. A. condensatum, Boiss. et Haussk. ♃ or ② Scurfy, *leaves silvery white ;* stems indurated at base, ascending, .12. Leaves minute ; obovate-oblong, obtuse, tapering into a petiole. Flowers larger than in last ; petals obovate. *Fruiting racemes umbel-like, contracted, corymbose.* Silicles *narrowly elliptical*, .004 long, .0015 broad, tapering at base, obtuse ; style one-third to one-half as long as pod — Summer — Subalpine regions of Amanus, and Akherdagh and northward.

‡ ‡ *Tall*, .3 *to* .8. *Lower-leaves more than* .01 *long, obovate or linear-spathulate. Silicles not more than* .005 *long.*

3. A. constellatum, Boiss. ♃ .5 or taller, scurfy ; stems herbaceous, reddish, loosely corymbose paniculate. Leaves oblong-spathulate, .04 long, .01 broad, tapering gradually into a petiole. Fruiting racemes contracted, umbel-like, corymbose ; silicles scurfy,

lenticular, .005 long, .002 broad ; style one-third their length — Later Summer — Subalpine regions of Amanus and northward.

Var. **confertum,** Boiss. Lower. Corymb contracted. Silicles .003 long, .002 broad — Alpine regions.

Var. **lepidotum,** Post. Leaves of sterile stems smaller, densely scurfy. Silicles as in last — Amanus.

4. A. argenteum, Wittm. ♃ .3 to .4, stems *clustered*, shrubby at base, herbaceous above, corymbose at apex. Lower-leaves obovate oblong, .012 long, .004 broad, upper linear-oblong, all scurfy white beneath. Fruiting racemes short, *corymbulate*, silicles scurfy, flattened, *obovate or orbiculate*, .003 to .004 long, .002 broad, style nearly as long as pods to half their length ; *seeds broadly winged* — May to October — Subalpine and mountain regions, Lebanon to Amanus, and northward.

Var. **macrocarpum,** Post. Stem-leaves .02 to .03 long. Silicles .005 long, .004 broad — Cassius and Amanus.

5. A. crenulatum, Boiss. ♃ .5 or taller, shrubby at base. Leaves of sterile branches scurfy white, *linear-spathulate*, .035 long. Fertile stems corymbose-paniculate. Leaves green, oblong-linear. Fruiting racemes contracted, almost umbel-like ; *pedicels capillary flexuous ;* silicles sparingly scurfy, *orbicular*, .002 to .003 in diameter, *retuse*, *membranous*, *crenulate at margin ;* seeds narrowly winged — Early Summer — Middle region of Mount Cassius.

‡ ‡ ‡ *Tall*, .3 *to* .4. *Lower-leaves linear*, *plicate*, *crowded*. *Silicles* .015 *long*.

6. A. samariferum, Boiss. et Haussk. ♃ or ♄ .3 to .5. Leaves of sterile branches scurfy *plicate*, of fertile green, linear, not plicate, all .02 to .03 long. Fruiting racemes corymbose. Pedicels filiform, reflexed. Pods *glabrous*, *papyraceous*, *obovate-orbicular*, *thin*, with short style, and wingless seeds — May and June — Middle mountain region of Amanus, and northward. Fruit resembling that of Peltaria.

† † *Biennials*. *Pods obovate*, .003 *to* .004 *long*.

7. A. eriophyllum, Boiss. et Haussk. ② Sterile stems .1, *crowded with minute*, *densely pannous*, oblong-obovate leaves ; fertile stems, .1 to .3, with few, green, sparingly woolly leaves. Inflorescence much branched, corymbose ; fruiting racemes *dense* .02 to .03 long ; silicles stellate-woolly, obovate-elliptical, .003 long ; style one-third their length ; seeds wingless — Summer — Amanus to Akherdagh, and northward.

Var. **umbellatum,** Post. Fruiting racemes .01 to .015 long, umbelliform. Silicles *lenticular*, .005 long, .0015 broad — Gesbeldagh. Akherdagh.

FIG. 30.



End of raceme of Alyssum Cassium.

8. A. Cassium, Boiss. ② .5 to .8, *green*, sparingly stellate-hairy. Stem *stout*, *leafy above*, densely corymbose. Leaves oblong, the lower often .05 long, tapering at base. Fruiting racemes .08 long ; silicles .004 to .005 long, on horizontal pedicels, sparingly hairy ; style one-half to one-third as long as pod ; *seeds narrowly winged* — Summer — Fields

Var. **canescens,** Post. Leaves smaller, obovate oblong, more or less silvery-canescent, mixed with green foliage — Khotsch-Bel, Amanus, 1,500.

* * *Silicles unequally convex ; cells 2-ovuled. Filaments winged, toothed or appendaged, rarely toothless.*

† *Perennials.*

9. A. montanum, L. ♃ .15 to .25, greenish or canescent ; branches ascending, *herbaceous*, or woody at base. Leaves oblong-obovate, or oblong-linear. Petals retuse. Fruiting raceme .04 to .06 long ; silicles more or less scurfy, obovate to orbicular, .004 long, retuse ; *style about as long as pod ;* seeds narrowly winged or wingless — May and June — Subalpine regions of Lebanon, Antilebanon, Cassius, and northward.

10. A. præcox, Boiss. ♃ .15, silvery-scurfy ; branches ascending, *woody*. Leaves obovate to oblong. Petals retuse. Fruiting racemes .02 to .03 long ; silicles glabrescent, ovate to obovate-orbicular, .006 long, retuse ; *style shorter than pod ;* seeds wingless — May and June — Middle region of Amanus, and northward.

Var. **nanum,** Post. .03, tufted. Fruiting racemes .01 long, contracted — El-Jebel-el-Abiadh, between Hamath and Palmyra.

11. A. suffruticens, Boiss. ♃ Scurfy-canescent ; branches *short, prostrate, zigzag*. Leaves oblong-linear. *Petals entire.* Silicles ovate, sparingly scurfy ; seeds wingless — Summer — Alpine region of Barakatdagh, Amanus. Summit of Hermon. (*Tristram*).

12. A. lepidotum, Boiss. ♃ .05, silvery-scurfy, *densely tufted ;* sterile branches .01 long, herbaceous. *Leaves minute, imbricated*, the lower spathulate, the upper ovate-elliptical. Petals retuse. Fruiting racemes .01 long or less, with few pods, *umbel-like ;* silicles scurfy, ovate-orbicular, .004 long, retuse ; style nearly half as long as pod — Summer — Top of Sunnîn, and northward.

13. A. Mouradicum, Boiss. et Bal. ♃ .15, scurfy ; branches prostrate or ascending. Leaves obovate to linear-spathulate. Petals obovate-cuneate, *entire*. Fruiting racemes .03 to .06 long ; silicles *glabrous*, ovate-orbicular, .006 long, retuse ; style about as long as pod ; seeds wingless — April to August — Middle, subalpine, and alpine zones of Lebanon, Nusairy Mountains, and northward.

14. A. tetrastemon, Boiss. ♃ .05, shrubby at base, scurfy below, short-woolly above. Leaves . . . . Petals oblong-cuneate *retuse.* Fruiting racemes short ; silicles *scurfy*, ovate, somewhat retuse ; style about as long as pod — Summer — Mountains of Northern Syria.

Var. **latifolium,** Boiss. Leaves oblong-elliptical — Summer — Mountains near Nazareth.

† † *Annuals.*

‡ *Petals nearly twice as long as calyx.*

15. A. macrostylum, Boiss. et Huet. ⊙ Canescent, *strigulose* with scattered, branched hairs ; branches short, prostrate or ascending.

Leaves obovate or oblong. Petals oblong-spathulate *entire.* Pedicels recurved ; silicles *twice as large as those of A. montanum, strigulose,* ovate ; style nearly as long as pod ; seeds wingless — Spring — Hermon (*Tristram*), Mount Akdagh, northern Syria, and northward.

‡ ‡ *Petals little if any longer than calyx.*

§ *Silicles glabrous.*

16. A. minimum, Willd. ⊙ .1 to .15, canescent-scurfy, dwarf, branching from base. Leaves oblong-linear. Petals linear, *retuse.* Fruiting raceme elongated, dense ; pedicels erect ; silicles orbicular, .0025 long retuse ; style one-sixth to one-fourth as long as pod ; seeds narrowly margined — Spring — Fields ; Aleppo and northward.

§ § *Silicles scabrous with stellate hairs.*

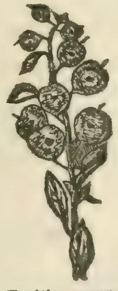
17. A. umbellatum, Desv. ⊙ .03 to .05, scabrous branching at base, prostrate or ascending, branches nearly simple. Leaves linear, or linear-oblong. Petals *retuse.* Fruiting racemes .01 to .02 long, contracted, *umbel-like or conical ;* silicles imbricated, ovate, .004 long ; style short ; seeds narrowly margined — April and May — Roadside ; El Kufr, Haurân. Northern Syria.

18. A. Szowitsianum, F. et M. ⊙ .02 to .1, appressed-canescent with stellate hairs, branching from base, branches simple. Leaves obovate to linear-oblong. Petals pale, narrowly *linear-cuneate, entire.* Fruiting racemes .015 to .05 long, *cylindrical ;* silicles *densely* imbricated, ovate, .003 to .004 long ; style short, seeds narrowly margined — April to June — Mountains of Haurân, Antilebanon, Lebanon, Cassius, to Aleppo, Aintab, and northward.

19. A. strictum, Willd. ⊙ .1 to .2, greenish-canescent, branching from base, branches simple. Leaves broadly oblong-linear, obtuse. Petals oblong-oblanceolate, entire. Fruiting racemes .06 to .09 long, cylindrical ; silicles *loosely* imbricated, *elliptical,* sparingly hirsute ; style short, *conical ;* seeds narrowly margined — Spring — Waste fields, Ba'albek, Mar'ash, and northward.

20. A. campestre, L. ⊙ .1 to .25, ashy or yellowish ; stems usually numerous, branching from base and above. Leaves oblong-oblanceolate to oblong. Petals bifid. Fruiting racemes .03 to .07 long ; pedicels spreading ; silicles *orbicular,* .003 to .005 long ; style one-fourth to one-sixth as long as pod ; seeds narrowly margined — Spring — Fields ; everywhere.

Fig. 31.



Fruiting raceme of Alyssum campestre.

Var. **genuinum,** Boiss. Rays of stellate hairs of pod short.

Var. **pilosum,** Post. Rays of stellate hairs of pod long.

Var. **hirsutum,** Post. Stellate hairs of pod *intermixed with simple or double hairs arising from a tubercle.* (*A. hirsutum, M. B.*)

* * * *Silicles convex, canescent ; cells* 2-*ovuled. Filaments toothless. Annuals.*

21. A. Damascenum, Boiss. et Gaill. ⊙ .1, ashy, branching from base. Leaves *all obovate to obovate-oblong.* Flowering racemes dense ; petals bifid. Fruiting racemes .02 to .03 long ; silicles scurfy, *orbicular,* .002 long ; style as long as pod, or shorter ; seeds wingless — Spring — Fields ; Damascus. Qaldûn. Deir 'Atîyeh.

22. A. calycinum, L. ⊙ .08 to .25, branching from base. Lower-leaves obovate, *upper oblanceolate to oblong-linear,* all silvery. Flowering racemes dense ; fruiting loose .08 to .1 long ; *sepals persistent in fruit ;* silicles orbicular, retuse, .003 long, *with flattened margin ;* style almost 0 ; seeds narrowly margined — Spring — Jebel Qaisûn, Damascus.

* * * * *Silicles flattened, glabrous ; cells* 3-6-*seeded. Filaments dentate. Petals twice as long as calyx. Annuals.*

23. A. aureum, Fenzl. ⊙ .1, branching from base. Leaves oblong-linear. Silicles elliptical .006 long, .003 broad ; *style half as long as pod* — Spring — Jerusalem to Haurân, Aleppo, and northward.

24. A. meniocoides, Boiss. ⊙ As above, with *linear-subulate leaves, and short style* — Spring — Mountains near Damascus, Deir 'Atîyeh, and northward. Too near the last.

33. DRABA, L. Whitlow-Grass.

Calyx erect, equal at base. Petals entire or retuse. Filaments toothless. Stigma capitate. Silicles lenticular or elliptical, flattened or (in ours) turgid. Seeds in 2 rows, often numerous, not margined — Annual or (in ours) perennial, dwarf herbs, usually tufted, with white or (in ours) yellow flowers, and undivided leaves.

* *Leaves pectinate-ciliate. Cells few-ovuled.*

1. D. Olympica, Sibth. ♃ .1 ; tufts broad, dense. Leaves narrowly linear, acute. *Stamens scarcely longer than calyx.* Silicles small, turgid, elliptical, 5-6 times as long as style — Summer — Rocky places in alpine regions.

Var. **heterocoma,** Boiss. All the leaves erect, or lower reflexed. Scapes glabrous. *Fruiting racemes often elongated.* Pods hairy — Amanus, and northward.

2. D. oxycarpa, Boiss. ♃ .02 to .06 ; tufts small, dense. Leaves oblong to linear, acute. *Stamens nearly as long as corolla. Fruiting racemes umbel-like ;* silicles scabrous with minute stellate hairs, ovate-lenticular, *long-acuminate,* .007 long, *exclusive of the* .003 *filiform style* — May to August — Alpine regions of Lebanon and Hermon.

* * *Leaves villous. Cells* 16-24-*ovuled.*

3. D. vesicaria, Desv. ♃ .01 to .05 ; tufts obconical, *very compact.* Leaves densely imbricated, oblong, acutish, villous with branching hairs intermixed with simple bristles. Sepals scabrous, scarious-margined. Petals nearly twice as long as calyx. *Stamens as long as calyx.* Silicles scabrous with short stellate hairs, elliptical, .005

long, .002 broad, *mucronate with short style* — May to September — Alpine and subalpine regions of Lebanon and Antilebanon.

34. EROPHILA, DC.

Calyx erect, equal at base. Petals bifid. Filaments free, toothless. Silicles elliptical to oblong — Annual dwarf herbs, with rosetted root-leaves, and racemed scapes with minute white flowers.

* *Cells of silicle* 7-8-*seeded.*

1. E. minima, C. A. M. ⊙ .03 to .1. Leaves linear, *often* .02 *long*, entire or dentate, slightly hirsute with simple hairs. Silicles .005 long or less — Spring — Fields, Lebanon to Damascus, Aintab, and northward. Top of wall of Jerusalem.

* * *Cells of silicle* 16-24-*seeded.*

2. E. præcox, Stev. ⊙ .1. Leaves oblong or elliptical, *somewhat petioled*, sparingly scabrous with branching hair. Silicles *orbicular-elliptical* — Spring — Damascus.

3. E. vulgaris, DC. .05 to .1. Leaves oblong, *sessile*, sparingly hispid with branching hair. Silicles *oblong-elliptical*, .005 *long* — Spring — Rasheiyah to Aintab, and northward.

4. E. setulosa, Boiss. et Bal. .05 to .1. Leaves *rhomboid*, sparingly furnished with *simple or forked bristles*, tapering to a petiole. Silicles oblong-elliptical, .007 long — Spring — Fields ; maritime plains of Syria ; lower zone of Lebanon ; Nusairy mountains.

35. LEPTALEUM, DC.

Sepals linear, erect, equal at base. Petals linear. Longer stamens long-connate in pairs, often reduced by abortion to two. Pod nearly indehiscent, linear, somewhat flattened ; valves 1-nerved, reticulate ; lobes of stigma connate in a minute cone — Annual, dwarf, white-flowered herbs.

L. filifolium, DC. ⊙ .03 to .1, glabrous, divaricately branched. Leaves thread-shaped undivided, or pinnatipartite with filiform lobes. Flowers .005 long, sessile, axillary. Pods .02 long, .002 broad — Hharrân in northern Syria, and northward, and eastward.

36. CAMELINA, Crantz. FALSE FLAX.

Calyx nearly equal at base. Petals entire, oblong-linear, tapering from apex to base. Filaments free, toothless. Pod an ovate, obovate, or orbicular silicle, or a linear-cylindrical silique, with keeled margins ; valves turgid, indurated ; stigma simple ; seeds in two rows, rarely in one — Annual herbs, glabrous or hispid with forked hairs. Flowers yellow. Root-leaves oblong, stem-leaves oblong-lanceolate, sagittate-auriculate.

* *Pods pyriform to orbicular or ovate. Seeds in* 2 *rows.*

1. C. sativa, L. ⊙ Sparingly pubescent. Leaves entire or repand-dentate. Fruiting racemes .1 to .15 long, rather compact. Pedicels spreading, *twice or thrice* as long as *glabrous*, margined, .008

long, reticulate pods ; *style half as long as pod* — Spring — Fields ; Beirût.

2. C. hispida, Boiss. ⊙ Patulous-hispid. Leaves dentate or repand. Fruiting racemes .15 to .25, loose. Pedicels spreading, *once and a half to twice* as long as glabrous, margined, .003 long pods ; *style as long as pod*, or longer — Spring — Fields ; Ba'albek to Palmyra, and northward, and eastward.

Var. **lasiocarpa,** Post. Pods *hispid.* Style *longer than pod* — Qaldûn to Aintab, and eastward. (*C. lasiocarpa, Boiss. et Bal.*)

* *Pods linear. Seeds in* 1 *row.*

3. C. anomala, Boiss. et Haussk. ⊙ Scabrous below with patulous stellate hairs. Stem much branched. Leaves nearly entire. Fruiting racemes long. Pedicels *one-third* as long as linear-cylindrical .01 to .015 long, .0015 broad pod ; style *thrice as long as breadth of pod* — Spring — Fields near Hharrân, northern Syria.

36 (a). CHRYSOCHAMELA, Boiss.

Calyx equal at base. Petals entire. Filaments free toothless. Silicle elliptical to ovate, turgid, valves somewhat keeled, 1-nerved — Dwarf yellow-flowered annuals, with sagittate-auriculate leaves, and zigzag fruiting racemes.

C. velutina, DC. ⊙ .08 to .15, canescent with branching hairs. Root-leaves oblong-lanceolate, dentate to pinnatipartite. Silicle .003 to .004 long ; pedicel capillary, twice or thrice as long as pod ; style short — Spring — Hills about Aleppo.

37. CAPSELLA, L.

Calyx equal at base. Petals obovate, entire. Filaments toothless. Silicles triangular-obcordate or ovate ; valves boat-shaped, wingless ; cells many-seeded — Annual herbs with rosetted root-leaves, and white flowers.

1. C. bursa-pastoris, L. ⊙ Shepherd's Purse. .3 to .4, glabrous, or hispid with forked or simple hairs. Root-leaves entire, repand, or runcinate-pinnatifid ; stem-leaves oblong-lanceolate, auricled. Silicles *triangular-obcordate* — February to August — Roadsides everywhere.

Fig. 32.

b a

(*a*) Pod of Capsella bursa-pastoris magnified two diameters. (*b*) The same with one valve removed to show seeds.

2. C. procumbens, L. ⊙ Dwarf. Leaves pinnatipartite into elliptical or lanceolate lobes, or undivided. Silicles *ovate, obtuse or subtruncate* — May — Valley of Hasrûn, Lebanon. Philistine coast. Jericho.

38. LEPIDIUM, L. Pepperwort. Pepper-grass.

Calyx equal at base. Petals entire. Stamens 4 or 2, toothless, free. Silicles flattened, orbicular, ovate, or elliptical, 2-celled, dehiscent ; valves wingless or winged ; cells 1-2-ovuled — Herbs or shrubs with minute white or yellowish flowers.

† *Silicles ovate or oblong, notched, winged ; style free.*

1. L. sativum, L. ⊙ .3 to .6 ; stem erect, stiff, paniculate. Root-leaves 1-3-pinnately cut or lobed, the upper linear, undivided. Flowering raceme long ; pedicels stiff, appressed ; silicles ovate-orbicular, .004 long, notched at apex, narrowly winged ; style as long as, or a little longer than sinus — April to June — Beirût to Cœlesyria, Moab and Jerusalem ; escaped from cultivation.

2. L. spinescens, DC. ⊙ .2 to .4, glabrous ; stem erect, stiff, divaricately branched. Lower-leaves 1-3-pinnately cut into linear lobes ; upper linear, entire or dentate. Flowering racemes short, elongated in fruit, *spinescent ;* pedicels stiff appressed ; silicles ovate, .004 long, notched at apex, narrowly winged ; style as long as, or a little longer than sinus — Spring — Fields ; common. Too near the last.

3. L. cornutum, Sibth. et Sm. ⊙ .1 to .4, glabrous ; stem erect, stiff, divaricately branched. Lower-leaves 1-2-pinnatisect, with toothed and cut lanceolate and linear lobes ; upper linear, entire or somewhat toothed. Flowering racemes short, elongated in fruit, spinescent ; pedicels stiff, appressed ; silicles *imbricated, erect, oblong,* .006 long, notched at apex for *one-sixth to one-third their length ;* wing-broad ; *style much shorter than sinus* — Spring — Syrian coast to Cœle-Syria and northward.

* * *Silicles ovate or oblong, notched ; wings adherent to style.*

4. L. Aucheri, Boiss ⊙ Sparingly stellate-puberulent, *prostrate ; stems diffuse,* .15 to .3 long. Lower-leaves oblong, .03 to .04 long, *pinnately divided into oblong, obtusely lobed or toothed segments ;* upper oblong, *tapering at base,* sparingly toothed or entire. Racemes axillary or terminal, compact in flower, loose in fruit, .1 to .15 long ; pedicels spreading in flower, appressed in fruit ; silicles *ovate-oblong, nearly quadrangular, slightly dilated at base,* .002 long ; wings *ovate, acutish ;* style *half as long as pod* — May — Roadside near Nedjha, south of Damascus.

5. L. Nebrodense, Guss. ♃ .1 to .15, *woolly-canescent ;* stems decumbent. Root-leaves .05 long, oblong, petiolate, entire, toothed, or obsoletely lyrate ; stem-leaves .01 long, oblong. minutely auricled at base. Racemes capitate in flower, oblong in fruit, .03 to .04 long ; pedicels *spreading,* longer than *hirsute, obovate,* .004 long silicles ; wings at apex, oblong, obtuse, one-third as long as cells ; style *a little longer than sinus* — May and June — 'Akkar.

Var. **microstylum,** Boiss. Style scarcely longer than sinus — Subalpine and Alpine Lebanon (*L. microstylum, Boiss. et Held.*)

* * * *Silicles transversely ovate,* .002 *to* .003 *long, wingless. Perennials.*

6. L. Draba, L. ♃ .3 to .5, pubescent ; stem erect, corymbose at apex. Leaves oblong to oblong-lanceolate, repand or dentate, those of root petiolate, of stem sagittate-clasping, Silicles *cordate at base,*

often with one rudimentary cell ; valves turgid — Spring — Fields ; common throughout.

* * * * *Silicles ovate to elliptical*, .001 *to* .003 *long, wingless. Perennials.*

7. L. Chalepense, L. ♃ .3 to .5, pubescent or glabrescent ; stems erect, corymbose at apex. Leaves oblong to oblong-lanceolate, repand-dentate, those of root petiolate, of stem sagittate-clasping. Silicles *ovate*, .002 to .003 long, rounded or *somewhat tapering at base and apex ; style one-third as long as pod* — Spring — Fields ; common. Too near the last. *Intermediate forms of pods between those of this and the last species are to be sought.*

8. L. crassifolium, W. K. ♃ .15 to .3, glabrous or puberulent ; neck fibrous, branching into many *paniculate-corymbose* stems. Leaves *fleshy*, those of root petiolate, ovate to oblanceolate, entire or sparingly toothed, of stem oblong to oblong-lanceolate, sagittate-clasping. Silicles ovate or elliptical, .002 long, *reticulate ; stigma sessile* — Spring — Salt marshes ; Merj of Damascus.

9. L. latifolium, L. ♃ 1, or more, glabrous or puberulent, *paniculate* above. Leaves oblong-lanceolate, entire or dentate, the lower long-petioled, .15 long, the upper short-petioled or *merely tapering at sessile base.* Silicles ovate-orbicular or elliptical, .001 to .0015 long, sometimes retuse at base, glabrous or puberulent ; stigma sessile — Summer — Marshy places, Lebanon, Antilebanon, and Damascus, to Aintab and northward.

10. L. graminifolium, L. ♃ .4 to 1, glabrous, much branched. Lower leaves and those of the last year's branches *oblong-spathulate*, crenate-dentate, or cut at base, upper stem-leaves *linear* entire. Fruiting racemes .15 to .3 long ; silicles .0015 to .002 long, ovate ; style short — Summer — Roadsides ; Hums to Antioch, Bitias, and northward.

***** *Silicles elliptical*, .003 *long, apex retuse, nearly wingless. Biennials.*

11. L. perfoliatum, L. ② .2 to .4, glabrous. *Lower-leaves* 2-3-*pinnatisect into minute, linear-oblong lobes ;* upper-leaves *ovate, deeply cordate-clasping.* Silicles orbicular-elliptical, .002 to .003 long ; style short — Spring — Roadsides and housetops ; Cœlesyria, Antilebanon, Damascus, and northward.

40. ÆTHIONEMA, R. Br.

Calyx more or less bigibbous at base. Petals entire. Longer filaments usually dilated, entire or toothed, free or connate in pairs. Silicles obcordate or obovate, winged or wingless, 1-celled, indehiscent, or 2-celled dehiscent, with 1-3 ovules in each cell — Glabrous herbs or shrubs, with pink, purple, or white, racemed or spiked flowers.

* *Tufted perennials. Silicles 2-celled ; cells 2-ovuled, narrowly winged.*

1. Æ. oppositifolium, Labill. ♃ .05. Leaves imbricated, fleshy, obovate, .01 long. Silicles *ovate-elliptical*, .008 long, *truncate, retuse* at apex, with exserted style ; funicle adnate at base — Summer — Alpine summits of Lebanon.

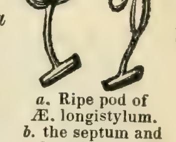
* * *Shrubby perennials.*

† *Silicles* 2-*celled ; cells* 1-*ovuled, winged.*

2. Æ. coridifolium, DC. ♄ .1 to .25, many-stemmed, stems simple, *the fertile as well as sterile leafy.* Leaves obtuse or acutish, obovate-oblong, *oblong-linear or linear*, the upper .01 long. Flowers .006 long, pink. Flowering and fruiting racemes dense, the latter .03 to .06 long ; silicles *obovate-oblong*, .007 long, notched at base and apex ; wings narrow, *boat-shaped*, entire ; *style much shorter than sinus* — Summer — Alpine and subalpine regions of Lebanon, Amanus, and northward.

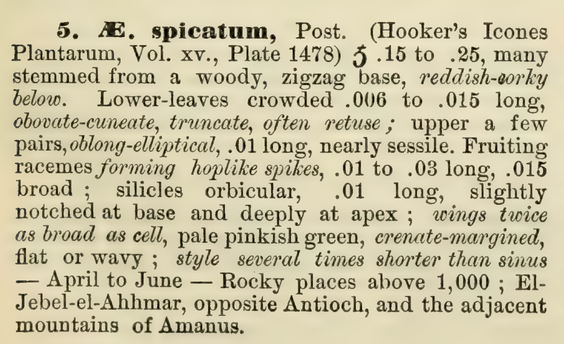
3. Æ. Armenum, Boiss, ♃ .1 to .2, with numerous simple stems. Leaves .006 to .008 long, *narrowly linear, acute.* Flowers .005 to .008 long, pink ; flowering racemes short, fruiting .03 long ; silicles .004 long, obovate, obtuse at base, with broad obtuse sinus at apex ; wings *crenate, broader than cells ;* style shorter than sinus — Summer — Middle zone of Amanus and northward.

Fig. 33.



a. Ripe pod of Æ. longistylum. *b.* the septum and style, with a seed, both natural size.

4. Æ. longistylum, Post. (Trans. Linn. Soc. Lond. 1888 p. 425) ♄ .2 to .3, many-stemmed from a woody, zigzag, decumbent base ; *fertile stems with few*, sterile with *many* .02 to .03 long, .003 to .005 broad, oblong-linear leaves, tapering at base, very obtuse at apex. Fruiting racemes rather loose, .02 to .05 long; silicles *obcordate-orbicular*, .008 long, deeply notched at apex ; wings as broad as cell, entire, *slightly incurved ; style longer than sinus* — Summer — Rocky places, 1,200 ; Jebel-el-Fughry in Lebanon; Kaipokdagh in Amanus.



5. Æ. spicatum, Post. (Hooker's Icones Plantarum, Vol. xv., Plate 1478) ♄ .15 to .25, many stemmed from a woody, zigzag base, *reddish-corky below.* Lower-leaves crowded .006 to .015 long, *obovate-cuneate, truncate, often retuse ;* upper a few pairs, *oblong-elliptical*, .01 long, nearly sessile. Fruiting racemes *forming hoplike spikes*, .01 to .03 long, .015 broad ; silicles orbicular, .01 long, slightly notched at base and deeply at apex ; *wings twice as broad as cell*, pale pinkish green, *crenate-margined*, flat or wavy ; *style several times shorter than sinus* — April to June — Rocky places above 1,000 ; El-Jebel-el-Ahhmar, opposite Antioch, and the adjacent mountains of Amanus.

Fig. 34.



Spike of ripe fruits of Æ. spicatum

6. Æ. stylosum, DC. ♄ .05 to .15 ; stems simple or branched, leafy. Leaves .01 long, *ovate-lanceolate, acutish*, the lower tapering to a short petiole. Flowers *capitate*, .007 long. Fruiting raceme elongated ; ovary ovate, *scarcely retuse ;* wings *denticulate ; style long* — Summer — Alpine summits of Lebanon.

7. Æ. Gileadense, Post. (Trans. Linn. Soc. London, 1888,

p. 425) ♃ .2 or more ; stem somewhat branched. Lower-leaves on sterile branches *obovate*, petioled, limb .005 long, *wavy-margined ;* upper linear acute. Flowers .... Fruiting racemes .1 long, loose ; silicles *obovate-orbicular*, .004 long, retuse at base, scarcely so at apex ; wings as broad as cells, *radiate-plicate*, *involute*, upper almost urn-shaped *crenate*, at length fimbriate ; *stigma sessile* — Spring — Woods near Es-Salt.

† † *Silicles* 2-*celled ; cells* 2-*ovuled*, *winged.*

8. Æ. cordatum, DC. ♃ .15 to .2, with few, rigid, leafy stems. Leaves crowded, *cordate or deltoid-cordate*, *clasping*, .008 to .01 long, the upper acute. Flowering raceme *capitate to oblong* ; flowers .006 long, *sulphur-colored.* Fruiting raceme elongated ; silicles *ovate*, *truncate-retuse at apex* ; wings somewhat dilated above, a little broader than cell, repand ; *style about as long as pod* — May and June — Subalpine regions of Lebanon and Antilebanon.

* * * *Annuals. Silicles* 2-*celled ; cells* 2-3-*ovuled with more or less flattened wings*, *or* 1-*celled*, 1-*seeded*, *urn-shaped*, *owing to convolution of wing. Plants* .1 *to* .25 *high*, *with lower-leaves ovate*, *more or less petioled*, *upper oblong-lonceolate*, *sessile*, *cordate at base.*

† *Fruiting racemes* .05 *to* .1 *long*, *compact but not spiked.*

9. Æ. cristatum, D.C. ☉ Silicles usually of both kinds, the two-celled orbicular, .008 in diameter, with *coarsely-toothed wings* broader than cells, and style much shorter than *open* sinus — Spring — Fields ; Hebron to Jerusalem, Aintâb, and Aleppo.

10. Æ. heterocarpum, J. Gay ☉ Silicles of both kinds, the two-celled orbicular, .008 in diameter, with *entire* wings broader than cells, and style shorter than *closed* sinus — Spring — Fields ; Judea and Gilead to Cœle-Syria, Antilebanon, Aleppo, and northward.

11. Æ. campylopterum, Boiss. ☉ Silicles of both kinds, the two-celled orbicular, .006 long, with *entire wavy wings*, broader than cells and style *longer than ovary*, and *much longer than open* sinus, *much less in number than the small*, *globular*, *urn-shaped*, *one-celled* pods — Spring — Fields ; Aleppo to Aintâb.

† † *Fruiting racemes* .01 *to* .04 *long*, *forming hop-like spikes.*

12. Æ. Buxbaumii, Fisch. ☉ Silicles all two-celled, orbicular, .01 long, with *entire*, *flattened wings twice as broad as cells*, and a short style at bottom of *deep*, *slit-like*, *closed* sinus—Spring — Fields ; Northern Syria and northward.

41. BISCUTELLA, L. Buckler-Mustard.

Sepals equal or saccate at base. Petals obovate, entire, clawed. Stamens free, toothless. Silicles indehiscent, twin, much flattened ; valves orbicular, separable from axis, 1-seeded — Annual or perennial herbs, often hirsute, with small yellow flowers.

B. Columnae, Ten ☉ .2 to .4. Leaves obovate-cuneate, to oblong-lanceolate and linear, dentate or entire. Stem nearly naked — Spring — Fields ; common throughout. (Fig. 35.)

42. HELDREICHIA, Boiss.

Calyx equal at base. Petals entire, Longer filaments winged; wing tapering or ending in a lateral tooth. Silicles flattened, almost twin, obovate to transversely ovate, truncate at apex, two-celled, dehiscent. Valves helmet-shaped, keeled, wingless; cells 1-ovuled; seed flattened, not margined.— Perennial, glabrous herbs, with white flowers.

H. bupleurifolia, Boiss. ♃ .1 to .3; root-stock slender, creeping, branching at apex; stems divaricately branching from base. Leaves fleshy, obovate to spathulate, petioled, entire, the uppermost linear, obtuse. *Silicles transversely ovate*, .004 long, .008 broad, rounded at base, truncate at apex, with short, apiculate style — Sept. — Dhohr-el-Qodhîb.

Fig. 35.



Fruiting raceme of Biscutella Columnae.

Var. subtriloba, Boiss. Pod somewhat trilobed, by enlargement at base of style — Top of Lebanon.

43. THLASPI, L. Penny-Cress.

Calyx equal at base. Petals equal, or in unequal pairs, entire. Stamens free, toothless. Silicles flattened, obcordate-orbicular, oblong or obtriangular, generally notched at apex. Valves boat-shaped, ovate.— Annual, biennial, or perennial herbs, with auricled, clasping leaves, and white or pink flowers.

* *Wing of silicles surrounded by a prominent nerve.*

† *Pods orbicular; sinus narrow, slit-like.*

1. Th. brevicaule, Boiss. et Ky. ⊙ .03 to .05. Root-leaves small, petioled, ovate; stem-leaves nearly entire, ovate; auricles acute. Petals white, retuse, once-and-a-half as long as calyx. Fruiting racemes *capitate;* silicles .008 long, with reticulated wings; *stigma sessile;* cells 4-6-seeded—May—Subalpine regions of Lebanon and Antilebanon.

†† *Pods obcordate, with broad sinus; cells 4-ovuled. Low herbs.*

2. Th. microstylum, Boiss. ⊙ or ② .08 to .1; stems many, ascending, short. Root-leaves petiolate, ovate; stem-leaves clasping with acutish auricles. Petals *pale flesh-colored*, twice as long as calyx; silicles *oblong-subcordate*, .008 long, *with somewhat narrow sinus;* wings nerved at apex, broader than cell; style *one-fourth* as long as sinus; — May — Alpine and subalpine zone of Lebanon and middle zone of Cassius.

3. Th. perfoliatum, L. ⊙ *Shemr-Murah* .1 to .2, branching from base, stems ascending, or erect. Root-leaves ovate-cordate, ovate, obovate or elliptical, petiolate; stem-leaves sometimes petioled, usually oblong-lanceolate, clasping, with rather obtuse auricles. Petals, *white*, usually irregular, about twice as long as calyx; silicles obovate-orbicular, .008 long; stigma sessile — March to May — Fields; common everywhere.

Var. **microcarpum,** Boiss. Pods .004 long.

Var. **rotundatum,** Boiss. Pods more rounded.

Var. **stylatum,** Post. Style about as long as sinus.

Var. **Natolicum,** Post. Petals two unequal pairs, the longer 3-4 times as long as calyx — More common in the mountains (*H. Natolicum, Boiss*).

Var. **longistylum,** Post. Petals as in last. Style *several times as long as sinus* — Nusairy Mountains.

* * *Wings not surrounded by a nerve, disappearing toward base of pod. Glaucescent, biennials with obtusely auricled stem-leaves ; cells 4-ovuled.*

4. Th. violascens, Schott et Ky. ② Root leaves repand, ovate-oblong, tapering into a petiole ; stem-leaves oblong, entire, acutish. Petals scarcely longer than *violet calyx ; anthers violet ; fruiting racemes pyramidal* .15 *long* or *longer*, dense ; pedicels as long as obcordate ob-triangular .006 long silicles ; wings rounded ; style scarcely half as long as narrow sinus — Spring — Grassy places ; Amanus and northward.

5. Th. densiflorum, Boiss et Ky. ② Root-leaves dentate, ovate-oblong, tapering into a petiole, stem-leaves entire, oblong, acute. Petals twice as long as calyx ; anthers yellow ; *fruiting racemes corymbose* .03 *to* .05 long, dense ; pedicels shorter than ob-triangular, obcordate silicles ; wings acutish ; style nearly half as long as narrow sinus — Spring — Amanus.

6. Th. elegans, Boiss. ② .3 or more. Root-leaves entire, obovate, tapering into a long petiole ; stem-leaves ovate. Petals twice and a half to thrice as long as calyx ; *fruiting racemes corymbose*, .04 to .05 *long*, dense ; silicles oblong-obcordate, .005 long with broad sinus, and acutish wings ; style half as long as diameter of pod — Spring — Amanus and northward.

44. CARPOCERAS, Boiss. Carpoceras.

Sepals equal at base. Petals equal, entire. Filaments free, toothless. Silicles ob-triangular or oblong, apex 2-horned with broad crescentic sinus ; valves boat-shaped, wingless, keeled — (Ours) Biennial herbs with white or pink flowers, and oblong to cordate leaves, the lower tapering to a petiole, the upper clasping.

1. C. oxyceras, Boiss. ② .6 to 1. Silicles *ob-triangular* .006 long ; horns awl-shaped from a triangular base, *half as long as pod ; style somewhat shorter than horns* — May and June — Woods ; middle mountain zone ; Galilee ; Cassius.

2. C. Cappadocicum, Boiss et Bal. ② .6 to 1, glaucous. Lower leaves .1 or more long. Silicles *oblong*, .01 long, .002 broad ; horns *very short, less than half as long as style* — May and June — Woods ; middle zone of Mt. Cassius. *Probably only a variety of the last.*

45. IBERIS, L. Candytuft.

Sepals equal at base. Petals unequal radiating. Filaments free, toothless. Silicles ovate or obovate ; cells 1-seeded ; valves boat-

shaped, winged — Small shrubs or monocarpic herbs, with umbellate white or pink flowers.

* *Leaves entire or nearly so. Flowers strongly radiating. Biennials.*

1. I. Jordani, Boiss. ② .1 to .15, branching from neck. Leaves somewhat setulose, entire or repand, oblong-spathulate to linear. Flowers pink, crowded in a flattened umbel ; silicles *in a short somewhat umbellike raceme*, ovate, .007 long, somewhat concave ; wings purple, acutish ; style *shorter* than sinus — May and June — Amanus.

2. I. Taurica, DC. ② .2 to .3, branching from neck. Leaves obovate-spathulate to linear-spathulate entire, or somewhat dentate. Flowers flesh colored or pink, in a hemispherical umbel ; silicles in a *short raceme*, with spreading or contracted pedicels, ovate ; wings acutish or obtuse ; style *longer* than sinus — Spring — Woods ; Cassius and northward.

** *Leaves more or less pinnatifid. Flowers scarcely radiating. Annuals.*

3. I. odorata, L. ⊙ .05 to .15, minutely bristly. Leaves linear-lanceolate or spathulate, pinnatifid toward apex. Flowers small ; silicles *umbellate*, glabrous, ovate ; wings acute, twice as long as style — March to May — Damascus to Nusairy Mountains, Aleppo, and northward and eastward.

46. TEESDALIA, R. Br. TEESDALIA.

Sepals spreading, equal at base. Petals equal, or the outer radiating. Stamens 4-6, with a scale at the inner side of base. Silicles obovate ; cells 2-ovuled ; valves boat-shaped, with keel-like wings — Annual glabrous herbs, with rosetted, pinnatifid root-leaves.

T. Lepidium, DC. ⊙ .05 to .1. Petals not longer than calyx ; stamens usually 4. Stigma sessile — July and August — Bikfaya.

47. HUTCHINSIA, R. Br. HUTCHINSIA.

Sepals equal at base. Petals entire. Filaments toothless. Silicles (in ours) elliptical, flattened, valves keeled, wingless ; cells 2-seeded — Small annuals, with pinnate leaves, and minute white flowers.

H. Petræa, L. ⊙ .1. Root fibrous, branches slender. Silicles .002 long, a little shorter than pedicels — Spring — Bare hills ; Moab.

48. SENEBIERA, Poir. Wart-Cress. Swine-Cress.

Sepals short, spreading, equal at base. Petals oblong. Filaments free, toothless. Silicles twin, indehiscent ; cells each containing one globular seed — Annual or biennial herbs, diffusely branched from neck, with minute white flowers.

S. Coronopus, L. ② *Reshâd barri.* Leaves 1-2 pinnatisect. Silicles nearly sessile, broader than long, tubercular-reticulate with dentate margin; style pyramidal — Spring — Roadsides; everywhere.

Fig. 36.



a. Raceme of Senebiera Coronopus in fruit with leaf opposite.
b. Silicle magnified 2 diameters.

49. PELTARIA, L. Peltaria.

Sepals spreading, equal at base. Petals with obovate, entire limb. Filaments free, toothless. Silicles somewhat stipitate, papyraceous, thin, orbicular, indehiscent, 1-celled, netted veined, with prominent margin, 2-4-ovuled but generally 1-seeded; style none; stigma dot-like; seed pendulous.—Tall, glabrous, perennial, corymbose herbs, with white flowers, and silicles on recurved filiform pedicels.

P. augustifolia, DC. ♃ .6 to 1. Root-leaves long-petioled ovate, often cordate at base; stem-leaves, tapering at base, lanceolate to linear— April to July — Rocky places, in middle zone of mountains; throughout

Fig. 37



Silicles of Peltaria angustifolia

50. CLYPEOLA, L. Treacle-Mustard.

Calyx equal at base, Petals entire. Filaments dentate appendaged. Silicles obovate to orbicular and elliptical, indehiscent, 1-celled, 1-seeded; stigma retuse; seeds not margined, flat, pendulous — Annual herbs canescent with stellate, scurfy wool; leaves oblong to linear-spathulate; flowers racemed, minute, yellow; pedicels recurved.

* *Silicles papery, hirsute; cell central, surrounded by a wing.*

1. C. jonthlaspi, L ⊙ .1 to .25. Petals *nearly as long as* calyx; silicles *almost orbicular*, slightly retuse at apex; seed half as broad as cell; wing entire; *stigma sessile*—April to June— Hills and sandy places; throughout.

Fig. 38.



Silicles of C. jonthlaspi

2. C. microcarpa, Moris. ⊙ .05 to .01. Petals about as long as calyx; silicles *obovate-elliptical*, slightly notched at apex; seed rather more than half as broad as cell; wing entire; stigma sessile—March and April—Stony places; Sinai. *Probably only a variety of the last.*

* * *Silicles leathery, echinate with retrorsely barbed bristles; wings* 0.

2. C. echinata, DC. ⊙ .05 to .15. Petals *scarcely longer* than calyx; silicles *obovate-orbicular*, obtuse; *style very short*—Spring —Hill country, east and west of Jordan, and northward to Damascus, and eastward.

4. C. lappacea, Boiss. ⊙ .1 to. 2. Petals *twice as long* as calyx; *thrice as long as those of our other species;* silicles *elliptical, acute, with long style* — Spring — Rocky places; Antilebanon and eastward.

51. ISATIS, L. Woad.

Sepals spreading, equal at base. Petals equal, entire. Filaments free, toothless. Silicle indehiscent, linear or ovate, with elongated, fungous (rarely membranous) cell; back flat, or surrounded by an obtuse margin, or winged only at apex; wing fungous or membranous; stigma sessile; seed 1, pendulous — Monocarpic or perennial herbs, with yellow flowers, petioled lower and sagittate upper leaves, and deflexed fruiting pedicels often thickened at apex.

* *Cell of pod fungous, surrounded by a membranous wing. Perennials.*

1. I. latisiliqua, Stev. ♃. Tall. Lower leaves oblong-spathulate, upper linear-lanceolate. Silicles glabrous or pubescent, varying greatly in size, *ovate-orbicular* or *oblong with rounded base*, or cuneate with obtuse or tapering apex; *wing broader than cell* — Summer — Alpine regions of Lebanon and Antilebanon.

* * *Cells of silicles oblong or linear, fungous, surrounded by a thick fungous wing.*

† *Perennials.*

2. I. glauca, Auch. ♃ .6 to 1.3. *glabrous, glaucous;* stem expanding into a *broad* panicle. Leaves entire; lowermost with petioles sometimes .3 long; upper *minute, scarcely auricled.* Silicles *tomentellous,* linear-oblong from a cuneate base, .013 long, .005 to .006 broad, obtuse or truncate-retuse — May and June — Fields; Qaldûn, north of Damascus, and northward and eastward.

3. I. Aucheri, Boiss ♃. .2 to .3, more or less *woolly* or *pubescent,* many-stemmed, with small, few-branched panicle. Leaves entire or repand; lowermost oblong-spathulate, including petiole .05 long; upper linear-lanceolate *acutely long-auricled.* Silicles *tomentose,* oblong, .015 long, .006 broad, truncate-retuse at apex; wing narrow, *dilated above cell* —May and June — Mountains about Behesne and northward and eastward.

Var. **vellerifera,** Boiss. Wool of silicles long, villous, completely hiding the cell — Marash.

4. I. hispida, ♃ .2 to .3 *hispid,* woody at base; panicle small, loose. Leaves mostly on lower sterile stems, entire or repand, obovate, tapering at base into a petiole, .1 to .12 long, .015 to .025 broad, obtuse, upper *few,* small, *not auricled.* Silicles (immature) *pannous, obovate,* somewhat dilated and truncate-retuse at apex; wing narrow, *hardly expanded above cell* — Summer — Subalpine regions of Akherdagh. Further study, with ripe fruits, is required to determine whether this species may not be a variety of the last.

5. I. cochlearis, Boiss. ♃ ? .6, *glabrous, except along ribs of leaves.* Leaves oblong-lanceolate, acutely dentate, those of stem lanceolate, auricled. Silicles .008 long, woolly, oblong-cuneate, scarcely winged above, cell *glabrescent,* somewhat concave — Summer — Mountains about Behesne.

† † *Biennials.*

6. I. tinctoria, L. ② Dyer's Woad. .6 to 1 glabrous; panicle broad, loose. Root-leaves acutish, oblong-lanceolate, entire or repand; stem-leaves lanceolate to linear, *sagittate.* Silicles glabrous or pubescent, oblong-linear with cuneate base, .012 long, .003 broad, 3-4 times as long as their breadth, obtuse, or retuse; cell narrow, obtusely ribbed — Spring — Plain of Gennesaret.

† † † *Annuals.*

6. I. microcarpa, J. Gay. ⊙ .3 to .4, *glabrous, glaucous.* Root-leaves oblong, nearly entire, .03 to .05 long; stem-leaves lanceolate or triangular, auricled, entire. Silicles, *elliptical,* .006 long .003 broad, rounded at base, obtuse or acutish at apex; cell *separated from wing by an almost obsolete groove* — Spring — Desert east of Moab, and southward to Sinai.

Fig. 39



Pods of Isatis Aleppica

7. I. Aleppica, Scop. ⊙ .3 to .6, glabrous or nearly so, forming an ample panicle. Lower leaves obovate, dentate or somewhat lyrate, including petiole .12 long, .04 broad; upper small, auricled, entire or repand. Silicles retrorsely puberulent, linear, .02 long .004 broad, rounded or retuse at apex; cell narrowly linear, *marked by a groove on either side* — Spring — Fields; throughout.

52. BOREAVA, Jaub. et Spach. Boreava.

Calyx somewhat bigibbous, spreading. Petals oblong-spathulate, clawed. Filaments toothless. Silicles nut-like, hard, indehiscent, ovate or nearly 4-angled, (in ours) 4-winged, one-seeded; style capitate; seed ovate, pendulous — Annual, glabrous, glaucous herbs, with paniculate-corymbose stem, entire, cordate-auricled leaves, bractless racemes, and medium-sized, pale yellow flowers, and aspect of Bunias.

B. Orientalis, Jaub. et Spach. ⊙ .3 to .6. Leaves oblong, acute, the lower often .08 to .1 long. Pedicels slender, somewhat spreading, nearly as long as silicles; silicle with style .008 to .01 long, somewhat tubercled, wavy-plicate between wings, tapering into a pyramidal, 4-angled style, half its length — Spring — Fields; Aleppo.

53. NESLIA, Desv. Neslia.

Calyx equal at base. Petals entire. Filaments toothless. Silicles compressed oblate-spheroidal, indehiscent, 2-ovuled, 1-seeded; stigma retuse, seed pendulous — Annual herbs, hirsute with branching hairs; stem-leaves sagittate; flowers small, yellow.

Fig. 40

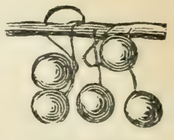
Pods of Neslia paniculata

N. paniculata, Desv. ⊙ .3 to .6. Leaves oblong to lanceolate, entire or dentate. Fruiting racemes .03 to .18 long, pedicels spreading, filiform, thrice as long as reticulated silicles; style apiculate — Spring — Fields; everywhere.

54. TEXIERA, Jaub. et Sp. TEXIERA.

Calyx loose, equal at base. Petals oblong, clawed. Filaments free, toothless. Silicles globose, glabrous, indehiscent, with membranous epicarp, thick spongy mesocarp, and crustaceous, unequally crested endocarp. Seed 1, pendulous — Glabrous, glaucous herbs, with small, pale yellow flowers.

FIG. 41



Pods of Texiera glastifolia.

T. glastifolia, DC. .15 to .3, branching from base or above. Lower leaves oblong, sinuate-dentate or pinnatifid ; upper oblong-lanceolate, sagittate, entire. Pedicels longer than pods, deflexed — Spring — Fields ; Zahleh to Damascus, Aleppo, and northward.

55. CALEPINA, ADANS. CALEPINA.

Calyx spreading, equal at base. Petals obovate. Filaments free, toothless. Silicles ovate spherical, indehiscent, beaked with a short, angular style, obsoletely 4-ribbed, reticulated, 1-celled; seed pendulous —Annual, white flowered herbs.

FIG. 42.

Raceme of Calepina Corvini

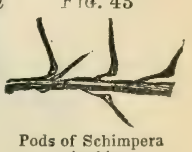
C. Corvini, All. Ped. ⊙ .3 to .6 glabrous. Root-leaves rosetted, lyrate ; stem-leaves oblong, auricled, dentate. Pedicels spreading, filiform, twice or thrice as long as pods — Spring — Fields ; common.

56. SCHIMPERA, Hochst. et Steud. SCHIMPERA.

Calyx spreading, equal at base. Petals equal, entire. Filaments free, toothless. Silicles indehiscent ; cell ovate, crustaceous, tubercled, ending in a linear, compressed beak. Seed 1, pendulous — Desert annuals, with minute yellow flowers.

S. Arabica, Hochst. et St. ⊙ *Es-Sufeirâ* .1 to .25, sparingly papillose-puberulent. Root-leaves rosetted oblong, runcinate-dentate or pinnatifid; stem-leaves linear, entire, auricled. Cell of silicle ovate ; beak oblique, thrice its length — March and April — Et-Tîh and southward.

FIG. 43



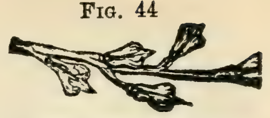
Pods of Schimpera Arabica

57. MYAGRUM, L. MYAGRUM.

Calyx somewhat bisaccate at base, nearly erect. Petals oblong. Longer filaments connate at base. Silicle indehiscent, leathery-corky obcordate, swelling into two rounded knobs at apex ; style short, 4-angled ; seed 1, pendulous — Annual glaucous herbs, with minute, pale yellow flowers.

M. perfoliatum, L. ⊙ .3. Leaves entire or repand, the lower oblong, tapering into a petiole ; the upper oblong to lanceolate, auricled. Pedicel thick club-shaped, shorter than the pod — Spring — Fields ; Coelesyria to Haurân, Damascus, Aleppo, and northward and eastward.

Fig. 44



Pods of Myagrum perfoliatum.

58. EUCLIDIUM, R. Br. Euclidium.

Calyx spreading, equal at base. Petals oblong-spathulate. Filaments free, toothless. Silicles small ovate, 2-celled, the sutures of the indehiscent valves manifest ; style (in ours) permanent, awl-shaped; stigma bilobed ; seeds 1 in each cell, pendulous.— Annual, rigid, dichotomous herbs, with small, sessile, white flowers.

Fig. 45

Pods of Euclidium Syriacum

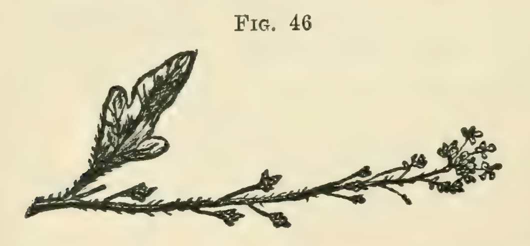
E. Syriacum, L. ⊙ .1, hirsute with branching hairs. Leaves oblong-lanceolate, entire or repand. Silicles scabrous — Spring — Fields and roadsides ; Haurân to Hums, Aleppo, and northward, and eastward.

59. OCHTHODIUM, DC. Ochthodium.

Calyx spreading, equal at base. Petals clawed, oblong-spathulate. Filaments dilated, toothless. Silicles leathery, indehiscent, globular-cubical, with tubercled-echinate angles, 2-celled ; style short, pyramidal ; seeds 1 in each cell, pendulous — Annual, branching herbs, with yellow flowers.

O. Ægyptiacum, L. .3 to 1, very sparingly hirsute. Leaves not auricled, the lower pinnatipartite or lyrate ; the uppermost lanceolate, entire. Fruiting racemes often .3 to .4 long, loose ; pedicels stiff, longer than pods — Spring — Fields ; common.

Fig. 46



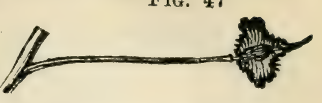
Raceme of Ochthodium Ægyptiacum, showing a leaf, immature fruits, and flowers.

60. BUNIAS, R. Br. Bunias.

Calyx erect or spreading, equal at base. Petals clawed, oblong-spathulate. Filaments free, toothless. Silicles nut-like, 4-angled, winged, ovate, 4 to 2-celled ; style pyramidal ; seeds 1 in each cell, pendulous, spoon-shaped — Yellow flowered herbs.

B. Erucago, L. ⊙ .3 to 1 or more, sparingly pubescent. Lower leaves runcinate or sinuate-dentate ; upper linear-oblong, acute, entire. Wings of silicle crest-like ; cells 4 — Spring —

Fig. 47



Ripe pod of B. Erucago.

Var. **echinata,** Boiss. Wings of pod split to base into 5-6 lanceolate teeth — Fields and hedges ; northern Syria.

61. ZILLA, Forsk. Zilla. *Sillah.*

Calyx erect, equal at base. Petals oblong, entire, long-clawed. Filaments free, toothless. Silicles crustaceous ovate-globular, corky-fungous, 2-celled ; style bony, beak-like ; seeds 1 in each cell, pendulous — Horny, nearly leafless, dichotomously branched, desert shrubs, with pink flowers

Z. myagroides, Forsk. ♄ *Es-Sillah.* .3 to .5, glabrous. Lower leaves rosetted, soon withering, oblong, repand-lobed, tapering into a petiole; upper oblong to linear, obtuse. Flowers .01 long ; silicle glabrous, smooth, or irregularly ribbed or pitted — December to April — Southern end of Dead Sea, and southward.

Fig. 48



Pod and thorns of Zilla myagroides.

62. CRAMBE, L. Crambe.

Calyx spreading, equal at base. Petals obovate, entire. Longer filaments generally toothed below apex. Loments indehiscent ; lower joint pedicelliform, seedless; upper globular, hard, 1-celled, 1-seeded; stigma sessile ; seed suspended by a funicle which ascends from the bottom of the cell, globular — Herbs or shrubs with a broad panicle of rather small white flowers.

* *Perennial. Lower leaves lobed, not parted.*

1. C. maritima, L. ♃. Sea-Kale. Glabrous. Root-leaves elliptical-oblong, or rounded, wavy, sinuate or lobed. Loment .008 to .01 long ; *upper joint ovate* — Spring — Coast (Tristram.)

2. C. Orientalis, L. ♃ .6 to 1, stem glabrous. Leaves scabrous, *ovate-oblong* to *oblong lanceolate*, the lowermost .2 to .3 long, undivided, the others pinnatifid or lobed — May to July — Fields ; Aleppo to Aintab.

Var. **Aucheri,** Boiss. Leaves *velvety-canescent* — Coelesyria, Antilebanon, and Damascus, to Aleppo and northward.

* * *Annual or biennial to perennial. Lower leaves lyrate.*

3. C. Hispanica, L. ⊙ .3 to .6, sparingly hispid. Lateral

segments of leaves 2-4, small, *terminal cordate-orbicular* — Spring — Mountains of Galilee. Samaria, Moab, and Gilead.

4. C. filiformis, Jacq. ② to ♃. .3 to .4, sparingly papillose-bristly. Lateral segments of leaves 2-4 small, *terminal with truncate or cuneate base, ovate-orbicular* — Spring — Plain of Gennesaret (Tristram.)

63. RAPISTRUM, Desv. Rapistrum.

Calyx spreading, somewhat bigibbous at base. Petals clawed, entire. Filaments toothless. Loment indehiscent; joints 1-celled; the lower oblong or pedicelliform, marked with sutures of indehiscent valves, seedless or with 1-2 pendulous seeds; the upper ovoid-globular, beaked, with 1 erect seed — Tall, yellow-flowered herbs.

Fig. 49.



Fruiting raceme of Rapistrum rugosum.

R. rugosum, L, ⊙ .3 to .6. Lower leaves lyrate; upper oblong, repand. Fruiting pedicels stiff, thickened, as long as and narrower than the obconical lower joint of loment; upper joint marked with longitudinal crests; style as long as pod — Spring — Fields and roadsides, common throughout.

Var. **longistylum,** Post. Style twice as long as pod.

Var. **clavatum,** Boiss. Lower joint often longer than pedicel; upper larger, nearly globular — Phœnician coast.

64. DIDESMUS, DC. Didesmus.

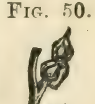
Calyx erect, somewhat bigibbous at base. Petals obovate, clawed. Filaments free, toothless. Loments oblong, leathery, with indehiscent, 1-seeded, generally angled and grooved joints, the terminal pyramidal; seeds globular, pendulous — Annual, white-flowered herbs, with aspect of *Myagrum* and *Erucaria.*

* *Leaves not divided, or only the lowermost lyrate.*

1. D. Ægyptius, L. ⊙ Sparingly scabrous. Leaves *oblong obtuse, remotely dentate,* or the lowermost lyrate. Joints of loment of equal length, ovate 4-angled, the terminal longer than style — Spring — Plain of Gennesaret.

* * *Leaves* 1-2-*pinnatisect.*

Fig. 50.





Pods of D. tenuifolius

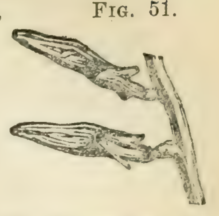
2. D. tenuifolius, Sibth. ⊙ .3, scabrous. Leaves pinnatisect into short, linear, entire or dentate lobes. Joints of loment *equal in length and thickness,* ovate-tetragonal, the terminal a little longer than style — Spring — Beirût, 'Aleih; probably introduced.

3. D. rostratus, Boiss. ⊙ Papillose-puberulent. Leaves bipinnatisect into short, linear lobes. *Lower joint of loment shorter,* cylindrical, *upper thrice as thick,* ovate-pyramidal, as long as style — Spring — Palestine (Roth). Jericho (Schlumberger). Beirût (Peyron)

65. CAKILE, L. Cakile.

Calyx bigibbous at base. Petals obovate, clawed. Filaments free, toothless. Loments with 2 joints; the lower shorter, top-shaped, truncate at apex; the upper (in ours) ensiform; both 1-celled, 1-seeded; stigma sessile —Annual, fleshy, glabrous, maritime herbs, with dentate, pinnate, or rarely entire leaves, and pale or pink flowers.

Fig. 51.



Pods of C. maritima, Scop. var. auriculata.

C. maritima, Scop. ⊙ Sea-Rocket. .25. Leaves pinnatifid, with linear, obtuse lobes. *Lower joint usually 2-toothed at apex* — Early summer — Sands of coast.

Var. **auriculata.** Lower joint of pod with *lateral auricles or barbs* below their middle (Fig. 51) — Beirût.

Var. **integrifolia,** Boiss. Leaves oblong, *entire or sinnate dentate* — Beirût.

66. ENARTHROCARPUS. Labill. Enarthrocarpus.

Calyx equal at base. Petals oblong, clawed. Filaments free, toothless. Loments elongated, terete or flattened, indehiscent; lower joint short, with 1-3 cells, each with one pendulous seed, or seedless; upper joint ∞-celled, often constricted, each cell with 1 erect seed — Annual branching herbs, with aspect of *Raphanus*, lower leaves lyrate, upper small, dentate; flowers yellowish-purple, veiny.

1. E. arcuatus, Labill. ⊙ .3 to .5, scabrous-puberulent. *Lower pedicels bracted;* loments .06 to .1 long, appressed-scabrous, *terete, torulose*, curved; beak short, straight, thick; lower joint *short* or none, 1-or 0-seeded — Spring — Seacoast of Syria, and lower mountain regions.

2. E. lyratus, Forsk. ⊙ *Abu-Qarn.* .3 to 1, sparingly papillose-hairy. *Pedicels nearly all bracted;* loments .04 to .05 long, appressed scabrous, *slightly flattened* and curved, *obsoletely torulose, ribbed and grooved lengthwise;* beak short, straight, *slender;* lower joint *elongated*, 2-3-seeded — Spring — Ras Beirût; probably adventive from Egypt. Jericho to Bir-es-Saba', Gaza, and southward.

Fig. 52.



Leaf and loment of E. strangulatus.

3. E. strangulatus, Boiss. ⊙ *Shilwat. Yasanîd* .3 to .6, more or less hispid, especially below. Pedicels nearly all bracted. Loments .03 to .04 long, appressed scabrous, especially at margins, *flattened, keeled,* curved, *torulose,* striate; beak *long, often hooked;*

lower joint 1-2-seeded — Spring — Wadies about Dead Sea. Borders of Et-Tîh, and southward to Egypt and Sinai.

67. HUSSONIA, Boiss. HUSSONIA.

Calyx bisaccate at base. Petals clawed, linear-oblong. Filaments toothless. Loments slender, elongated ; lower joint short, terete, 1-2-celled, seeds 1-2 in each cell, pendulous ; upper joint ∞-celled, each cell with 1 cylindrical-linear seed ; beak long — Annual desert herbs with aspect of Erucaria, but well distinguished by the long, slender, and contorted pods.

H. uncata, Boiss. ⊙ .2 to .3, scabrous below, glabrous above, flexuous, twining among shrubs. Leaves pinnatisect, lobes linear to oblong, entire or dentate to pinnatifid. Loments short pedicelled, .03 to .04 long, curved or contorted ; beak hooked — Spring — Et-Tîh and southward.

68. ERUCARIA, Gærtn. ERUCARIA.

Calyx erect, equal at base. Petals obovate, clawed. Filaments toothless. Loments 2-jointed, slender ; lower joint terete, dehiscent, longer than upper, 2-celled, 2-valved ; seeds 2-6 in each cell, pendulous ; upper joint indehiscent, ovate or ensiform, beaked, cells 1-3, 1-seeded — Annual, branching herbs, with pinnatisect leaves, and lilac flowers.

1. E. Aleppica, Gaertn. ⊙ .3 to .6, nearly glabrous. Lobes of lower leaves *linear or oblong*, pinnatifid, those of upper narrow, elongated, entire. Loments stiff, .015 long, generally appressed ; lower joint *cylindrical*, many-seeded, upper ensiform, somewhat keeled, 1-seeded, *nearly as long as lower, and as long as awl-shaped style* — February to June — Roadsides ; common throughout, especially in the Ghor, and east of the Jordan.

Var. **puberula,** Boiss. The whole plant puberulent. Between Jerusalem and Jericho.

Var. **latifolia,** Boiss. Lobes of lower leaves broader.

Var. **horizontalis,** Post. Ripe pods horizontal. Lobes of leaves short, at right angles to axis.— Nedjha, south of Damascus. A plant with the spreading pods of E. crassifolia.

2. E. lineariloba, Boiss. ⊙ Glabrous, tall. *Lobes of leaves linear awl-shaped.* Loments appressed ; upper joint slender, 1-2-seeded, torulose, *longer than filiform style* — Spring — Eastern highlands (Tristram).

3. E. microcarpa, Boiss. ⊙ .1 to .3 papillose-scabrous. Lobes of lower leaves *at right angles to axis, fleshy, short,* pinnatifid ; of upper linear, entire. Loments .006 long, ascending, glabrous or scabrous ; lower joint *torulose, flattened,* many-seeded ; upper ovate, *half as long as lower, shorter than style* — February to April — Around Dead Sea, and in Et-Tîh, and southward to Egypt.

Var. **major,** Post. Plant larger, reaching .5. Pods with style .008 long. *Style as long as both joints* — El-wadi-el-Abiadh in Et-Tîh.

4. E. crassifolia, Forsk. ⊙ *Krumb-es-Sahrah.* .3 to .4, glabrous. Lobes of leaves oblong-linear to linear, entire, or sparingly dentate. *Young loments deflexed, at maturity nearly horizontal,* .016 long, lower joint *half as long as upper,* cylindrical, many-seeded, upper ensiform, somewhat keeled, thicker than lower ; *beak short,* awl-shaped — Spring — South end of Dead Sea.

69. RAPHANUS, L. Radish. *Fijl.*

Calyx erect, bisaccate at base. Petals long-clawed, obtuse or retuse. Filaments free, toothless. Loments terete ; lower joint narrow, top-shaped, sterile, very short, sometimes 0 ; upper elongated, continuous, or necklace-like, with cells in 1 row breaking up into segments ; seeds globular, pendulous — Annual or perennial herbs, with lyrate lower leaves, and lilac or yellow, more or less purple-veined flowers.

* *Upper joint of loment continuous, with 2 longitudinal cells.*

1. R. sativus, L. ⊙ Common Radish. ***Fijl.*** .5 to 2, sparingly papillose-hairy or glabrescent. Upper joint of loment .03 to .05 long, .01 thick, *oblong-conical, inflated, glabrous, longer than beak* — Spring — Escaped from cultivation ; everywhere.

2. R pugioniformis, Boiss. ⊙ .3 to .5, papillose-scabrous. Upper joint of loment with beak .1 to .13 long, *papillose-scabrous,* seed bearing portion .005 thick, conical-cylindrical, *one third as long as* beak — April to June — Moist grassy places ; Antilebanon to Banias, and Galilee.

* * *Upper joint of loment 1-celled, but constricted between seeds.*

3. R. Raphanistrum, L. ⊙ Wild Radish. Jointed Charlock. *Fijjaileh.* .3 to 1, sparingly scabrous. Upper joint of loment glabrous, .05 to .08 long, .004 thick, *necklace-form, with two to eight nodes,* ribbed ; *beak* 3-5 *times as long as upper node* — Spring — Fields ; common.

Fig. 53.



Pod of R. Raphanistrum.

* * * *Upper joint of loment with 1-row of 1-seeded cells, separating with difficulty.*

4. R. Aucheri, Boiss. ⊙ .5, scabrous with retrorse hairs. Flowers yellow, not veined. Pedicel short, *recurved in fruit ;* upper joint of loment .06 to .1 long, .003 thick, *strigose with retrorse hairs,* somewhat tapering at base ; *beak short, indistinct* — Spring — Syrian coast. Around base of Hermon. Around Dead Sea.

70. ANCHONIUM, DC. Anchonium.

Calyx erect, somewhat gibbous at base. Petals clawed. Longer filaments connate in pairs. Loments somewhat terete, tapering into a beak-like style, leathery, with 2-6, 1-seeded, pithy cells in pairs, separated by a thick septum ; stigma thick, 2-lobed ; seeds oblong, thick — Perennial, alpine, stellate-woolly herbs.

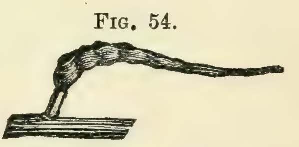
A. Billardieri, DC. ♃. .3 to .6, greyish-canescent, glandular, branching from base. Root-leaves oblong, petioled, tapering at base and apex, obsoletely repand-dentate. Racemes at length loose, flowers bracted ; petals purple, somewhat longer than calyx ; loments erect, glandular-scabrous, oblong-lanceolate, .015 to .02 long, .004 broad at base, somewhat flattened, tapering into a long style — May to August — Alpine regions of Lebanon and Antilebanon.

71. CHORISPORA, DC. Chorispora.

Calyx erect, bisaccate at base. Petals clawed. Filaments free, toothless. Loments elongated, cylindrical, separable into segments, long-beaked, with 2 rows of numerous 1-seeded cells, generally alternating with sterile ones ; stigma indistinctly 2-lobed — Annual herbs, with aspect of Raphanus.

Ch. Syriaca, Bois. ⊙ .2 to .4, glandular-hairy. Lower leaves lyrate-pinnatifid, upper oblong, petioled, tapering at base and apex, denticulate. Flowers purple. Loments with beak .03 to .04 long, .003 thick, cylindrical, somewhat torulose, scabrous with retrorse papillæ, a little longer than awl-shaped beak — Spring — Fields ; Jerusalem to Cœlesyria, Damascus, Haurân and Palmyra.

Fig. 54.



Pod of Chorispora Syriaca

72. STERIGMA, DC. Sterigma.

Calyx erect, equal at base. Petals clawed. Longer filaments connected in pairs. Loment terete, somewhat torulose, pithy, at length separating irregularly ; cells 1-seeded, arranged in pairs ; lobes of stigma divergent ; seeds oblong, thick.— Monocarpic, yellow-flowered herbs, canescent with stellate wool.

S. sulphureum, Russ. ② .5. Lower leaves oblong-lanceolate, runcinate-pinnatifid ; upper dentate or entire. Pedicel as long as flower ; loments .05 to .06 long, .002 thick, canescent not glandular, tapering into a short style — May and June — Cœlesyria to Damascus, Aleppo, and northward and eastward.

Order VII. CAPPARIDACEÆ. (Caper Family.)

Herbs or shrubs with alternate leaves and regular or irregular, usually cruciform flowers, and 4-6-∞ *(not tetradynamous) stamens ; ovary sessile or stipitate,* 1*-celled, or* 2-8*-celled by means of false septa arising from parietal placentæ* – Sepals 4 (rarely 5). Petals 4 (rarely 0). Stamens

inserted at the apex of torus. Ovary 2-∞-ovuled. Fruit capsular, dehiscent, 2-valved, or berry-like. Seeds kidney-shaped, cotyledons incumbent. Albumen little or 0.

TRIBE I. **CLEOMEÆ.** Fruit capsular.

1. CLEOME. Capsule resembling a silique, 2-valved, many-seeded.

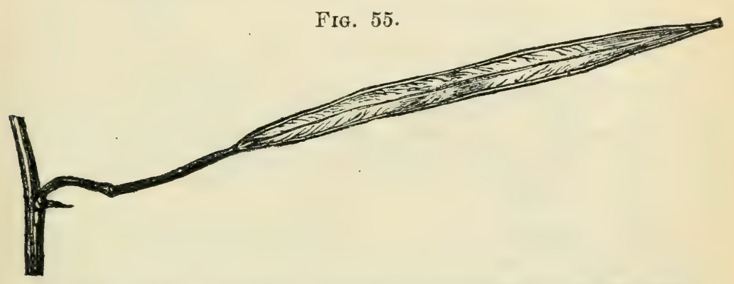
TRIBE II. **CAPPAREÆ.** Fruit fleshy, baccate, indehiscent.

2. CAPPARIS. Leaves simple. Petals not clawed.
3. MÆRUA. Leaves simple. Petals in ours 0.
4. CRATÆVA. Leaves 3-foliolate. Petals long-clawed.

1. CLEOME, L. Cleome.

Calyx 4-parted with deciduous lobes. Petals 4, hypogynous. Stamens (in ours) 4-14. Torus hemispherical or elongated. Capsule stipitate or sessile, the two valves at length separating from placentae — Perennial herbs or shrubs.

FIG. 55.



Ripe pod of Cleome pentaphylla, showing the stalk between the pod and pedicel

* *Stamens* 6, *coalescing below with gynophore, free above. Leaves palmate.*

1. C. pentaphylla, L. ⊙ *Mentanah. Tamalîkah.* .5 to .8, glabrescent. Leaflets of lower leaves 5, oblong-elliptical, of upper 3, minute. Petals long-clawed, 2-5 times as long as calyx ; *filaments free from middle of gynophore ;* capsule (FIG. 55) linear, much longer than gynophore ; seeds *concentrically wrinkled*—Spring—Plain of Sharon.

FIG. 56.



Flower of Cleome pentaphylla (*a*) Four of the six stamens. (*b*) The ovary. (*c*) The gynophore. (*d*) The petals. (*e*) The sepals. (*f*) The pedicel.

** *Stamens* 4-6, *free from their base.*

† *Leaves* 3-*foliolate, or the upper only simple.*

‡ *Seeds woolly.*

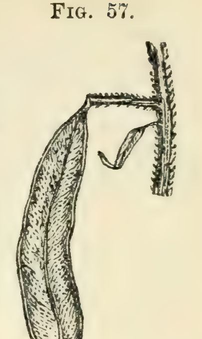
2. C. Arabica, L. ⊙ *Um-Rumail. Zifrah. Shajarat wahhsh* .3 to .5, densely glandular-pubescent, branched. Leaflets oblong-linear .015 to .03 long. Pods (FIG. 57) sessile, pendulous, oblong, reticulate, glandular, .04 to .05 long, .008 broad — Spring — Ain-el-beidha at lower end of Dead sea, and southward.

‡ ‡ *Seeds glabrous.*

3. C. ornithopodoides, L. ⊙ .3 to .5, *sparingly* glandular-pubescent, sparingly branched above. Leaflets oblong-linear .01 to .02 long. Pods stipitate or sessile, deflexed, *linear*, striate, *torulose*, slightly papillose-glandular, .03 to .05 long, .0015 broad — Spring — Aintâb and northward and eastward.

4. C. brachycarpa, Vahl. ♃ *Berberân.* .3 to .4, glandular, branching from neck. Leaflets thickish, *lenticular to obovate-oblong*, .005 to .01 long, floral minute, often simple. Pods sessile, glandular, .01 to .012 long, .002 broad — Spring — Sinai near Red Sea.

Fig. 57.



Pod of Cleome Arabica.

† † *Leaves simple.*

‡ *Stamens* 6. *Pods short-stipitate. Seeds woolly,*

5. C. Kotschyana, Boiss. ♃ .3, herbaceous, *glaucous*, *glabrous below ;* stems simple or sparingly branched. Leaves long-petioled, ovate, *obtuse*, 3-nerved ; upper sessile, minute, ovate-oblong. Petals *pale*, obsoletely veined ; pods *linear-spathulate*, *glabrous*, .05 long, .012 to .015 broad at upper end — Spring — Desert between Hamath and Palmyra, and eastward.

6. C. trinervia, Fresen. ♃ .5 to .6, *densely scabrous with yellow*, stipitate glands, branching from base. Leaves petioled, ovate, *acute*, 3-nerved, the lower .03 long, sometimes obscurely 3-lobed, the upper minute, oblong, to oblanceolate. Petals *reddish*, veined ; pods *linear*, .05 to .07 long, .005 to .006 broad, *glandular-scabrous* — Spring — Gravel ; in valleys and plains about the Dead Sea, and southward to Sinai and Arabia.

‡ ‡ *Stamens* 4. *Pods not stipitate. Seeds glabrous, minutely dotted.*

7. C. droserifolia, Del. ♄ *Rîhh-el-bard.* .2 to .6, *strigose* with stipitate, yellow glands, much branched from base, *brittle.* Leaves long-petioled, *round to kidney-shaped or cordate*, .01 long and broad. Petals *yellow ;* pods *oblong-cylindrical*, scarcely .01 long, .003 broad, shorter than pedicels, glandular — Spring — Around the Dead Sea, and southward to Sinai and the Egyptian desert.

‡ ‡ ‡ *Stamens* 10-14. *Seeds glabrous.*

8. C. chrysantha, Decaisne. ♄ *Sufeir atân.* .3 or more, shrubby, glandular, branches flexuous. Leaves short-petioled, *ovate*, acutish .006 to .008 long. Pods *ovate* .005 long, glandular ; pedicels *twisted, recurved* — Spring — Sinai.

2. CAPPARIS, L. Caper. *Kabar.*

Calyx 4-parted. Petals 4, imbricated in bud. Torus short. Sta-

mens 8-15-∞, free. Ovary long-stipitate. Berry globular or ovate, many-seeded — (Ours) shrubs with simple leaves and thorny stipules.

* *Stamens* 8-15. *Petals scarcely longer than calyx, red.*

1. C. Sodada, R. Br. ♄ *Tundûb.* Branches long, wand-like, decumbent. Leaves *linear-convolute,* .004 *long, ending in a prickly mucro, deciduous before flowering.* Berry globular, .008 in diameter, shorter than its stipe, apiculate — Spring — Shittim plain, and southward.

Fig. 58.



Capparis Sodada (*a*) A flower. (*b*) A fruit on its long stipe.

* * *Stamens* ∞. *Petals much longer than calyx, white.*

2. C. spinosa, L. ♄ Thorny Caper. *El-Asaf.* 1 to 1.5 ; branches decumbent or pendulous. Leaves *orbicular or ovate,* .02 *to* .04 *long. Sepals nearly equal.* Berry oblong to obovate-oblong, .05 to .06 long, as long as or shorter than its stipe — May to July — Everywhere ; usually pendulous from face of rocks and walls.

Fig. 59.



Flowering branch of Capparis spinosa.

Var. **genuina,** Boiss. *Glabrescent.* Leaves nearly round, *retuse.* Stipules hooked. Flowers .06 to .08 broad— Common.

Var. **canescens,** Boiss. More or less pubescent. Leaves ovate or elliptical, *often ending in a prickle.* Stipules hooked. Flowers as in last — Common.

Var. **Aegyptia,** Boiss. Glabrous or pubescent. *Leaves fleshy,* round, *glaucous,* obtuse or retuse, with or without prickle. Stipules hooked. Flowers medium-sized — Tripoli; around the Dead Sea and southward.

Var. **parviflora,** Boiss. Canescent or velvety. Leaves *small,* ovate-oblong or round, generally acute with prickle at apex. Stipules hooked, often strong. *Flowers* .02 *to* .04 *broad* — Damascus, Zahleh.

Var. **glauca,** Post. *Glaucous.* Leaves round to round-obovate, with or without prickle. Stipules small, nearly straight : Flowers as in last — Banias.

3. C. galeata, Fresen. ♄ 2 to 3, glabrous, glaucous, with *erect branches.* Stipules short, hooked. Leaves *ovate-elliptical,* .02 to .05 long, fleshy, often prickly at apex. *Upper sepal helmet-shaped,* longer than the rest. Berry obovate-oblong, .05 long, as long as its stipe — Early Spring — South end of Dead Sea, and southward to Sinai and Egypt.

3. MÆRUA, Forsk. Mærua

Calyx funnel-shaped, with four, valvate, deciduous lobes. Petals (in ours) 0. Torus lining bottom of calyx, prolonged to its middle ; margin simple or prolonged into a fringed disk. Stamens ∞, free, or attaced at base to gynophore. Ovary stipitate, many-ovuled. Berry cylindrical, torulose, transversely ∞-celled, the cells 1-seeded — Unarmed shrubs with simple leaves.

Fig. 60.



Leaf, calyx, stipe, and fruit of M. uniflora.

M. uniflora, Vahl. ♄ Leaves oblong-elliptical, short-petioled, hirtulous. .01 long. Pedicels solitary, shorter than leaves; calyx .012 long ; fruit velvety — Spring — Sinai and southward.

4. CRATÆVA, L. Cratæva.

Calyx 4-parted, with imbricated, deciduous lobes. Petals 4, long-clawed. Torus hemispherical, lobed. Stamens 8-20 ; filaments elongated. Ovary long-stipitate, 1-2-celled. Berry ovate — Glabrous, thornless shrubs, with 3-foliolate leaves.

C. gynandra, L. ♄. Leaflets ovate — Spring — Sulphur-springs, east of Dead Sea. (Tristram).

Order VIII. RESEDACEÆ. (Mignonette Family).

Herbs with irregular, unsymmetrical, 2-8-*merous, small flowers, in terminal spikes or racemes, a fleshy, hypogynous, one-sided disk (rarely* 0*) between the petals and the* (3-40) *stamens, bearing the latter* — Calyx open in bud, persistent. Petals variously parted, rarely entire, the upper larger. Disk sessile or stipitate. Anthers introrse. Ovary sessile or stipitate, consisting either of 3-6 connate carpels forming a 1-celled pod, (occasionally baccate) with parietal placentæ and an open or closed mouth with 3-4 teeth, or of 6 carpels connate only at base forming a 6-celled capsule with basilar placentae. Cotyledons incumbent. Shrubs or herbs.

* *Fruit baccate. Desert shrubs; branches spinescent; leaves deciduous.*

1. OCHRADENUS. Petals 0. Disk one-sided. Capsule closed.

** *Fruit a* 1-*celled,* 3-6-*lobed,* 3-4-*horned capsule.*

2. RESEDA. Petals 4-8, the upper with dissected limb. Disk one-sided.
3. OLIGOMERIS. Petals 2, entire or lobed. Disk 0. Annuals with entire leaves.

*** *Fruit a capsule composed of* 6 *cells, connate at base.*

4. CAYLUSEA. Petals 5, the upper with dissected limb. Disk one-sided.

1. OCHRADENUS, Del. OCHRADENUS.

Sepals 5-6. Petals 0. Disk expanded above. Stamens 10-15. Ovary 3-toothed. Capsule closed, fleshy, baccate — A shrub with intricate, rigid, at length leafless, spinescent branches.

O. baccatus, DC. ♄ *Qurdhah.* 1 to 6, glabrous. Leaves linear. Flowers very short-pedicelled. Capsules *obovate-globular* — Spring — Around the Dead Sea, and southward.

2. RESEDA, L. MIGNONETTE. *Khuzâm.*

Sepals 4–8. Petals 4-8, the upper more or less dissected. Disk one-sided, the upper part plicate. Stamens 10-40. Ovary 3-4-toothed. Pod 3-6-angled or lobed with gaping mouth — Monocarpic or perennial, branching herbs, with entire or 1 3-ternate or 1-2 pinnatifid leaves.

* *Flowers* 5-6-*merous. Pods erect,* 4-*toothed. Leaves* 1-2-*pinnatisect.*

1. R. alba, L. ⊙. White Mignonette. .6 to 1, glabrous or sparingly papillary. Flowers large, racemose-spiked; petals *twice as long* as calyx; fruiting pedicels *longer* than calyx; pod *ellipsoid-cylindrical,* .01 *to* .015 long, — Spring — Fields and roadsides, and often hanging from walls; common.

FIG. 61



Pod of R. Alba.

2. R. propinqua, R. Br. ② .1 to .3, nearly glabrous, branching at base. Leaves mostly near base. Flowers minute, *spiked;* petals *a little longer* than sepals; pod *almost sessile, obovate to oblong,* .005 long, — Spring — Deserts and dry places; from Hama and Palmyra to Et-Tîh, and southward.

Var. **foliosa,** Post. .3 to. 4; stems leafy above; spikes looser. Between El-Hurmul and Riblah; Jericho.

** *Flowers* 6-8-*merous. Pods* 3-*toothed. Leaves entire or* 1-2-*ternate-cut, sometimes pinnate.*

† *Sepals persistent.*

‡ *Pods at length pendulous. Seeds pitted, wrinkled.*

§ *Ovary not stipitate. Filaments persistent.*

3. R. Arabica, Boiss. ⊙ .1 to .25, sparingly pruinose. Lowest leaves simple, oblong-linear, upper ternate, with linear to lanceolate lobes, sometimes wavy. *Pedicels longer and petals shorter* than calyx; pods *nearly globular* — Spring — Border of Et-Tîh, and southward.

§ § *Ovary stipitate. Filaments soon deciduous.*

¶ *Fruiting calyx growing little, if any.*

R. Alopecuros, Boiss. ⊙ .5 to .6, *hirsute with elongated papillæ.* Lowest leaves entire, upper pinnate or 2-ternate with oblong-lanceolate to linear-lanceolate lobes. Raceme *long, dense; flowers odorless*; pods .01 to .015 long, inflated, scabrous at angles — Spring — Fields; Me r 'Ayûn to Galilee, Samaria and Gaza.

5. R. odorata, L. ⊙ Mignonette. *Khuzâm* .2 to .3, glabrous or *sparingly scabrous.* Lower leaves entire spathulate, upper 3-*parted.* Raceme *short, loose; flowers sweet-scented* (the only species with odor); pods .006 to .01 long, knobbed, nearly glabrous at angles — Spring — Escaped from cultivation. Found wild in Wadi Zuweirah, at south end of Dead Sea, (Tristram).

¶ ¶ *Fruiting calyx growing.*

6. R. Orientalis, Boiss. .3 to .6, papillose-scabrous, decumbent or ascending. Leaves oblong to oblanceolate, entire or trifid. Racemes loose; sepals linear, somewhat longer than *spathulate* lobes of corolla; pod *oblong-obovate,* .01 long — Spring — Sandy fields, along coast; Hhûleh. Too near R. Phyteuma.

‡ ‡ *Pods erect,* (*rarely pendulous*) *Seeds smooth. Calyx not growing.*

7. R. lutea, L. ② .5 to .6 or more, papillose, erect. Lower leaves sometimes entire, upper 1-2-ternately parted. Racemes at first short dense, in fruit elongated loose; rachis glabrous; pedicel longer than flower; sepals linear, tapering, as long as *yellow* petals; filaments scabrous; pods .01 to .013 long, *erect* or nodding, *ovate to oblong* — Spring — Fields; common throughout.

Var. **genuina,** Post. Pods oblong, or oblong-club-shaped, erect.

Var. **ovata,** Post. Pods ovate, or round-ovate, truncate, erect or ascending — Lattakia; Damascus; Aintâb.

Var. **nutans,** Boiss. Pods ovate-oblong, nodding — Béthel; Sheikh Mohammed; Hums; Nusairy Mountains.

8. R. globulosa, F. et Mey. ⊙ .3 to .5, glabrous or nearly so. Leaves 1-ternate, or pinnately 5-parted. Racemes loose, elongated in fruit; pedicels longer than flowers and capsule; flowers minute .0015 broad; sepals 6, half as long as upper petals, oblong-lanceolate, *denticulate;* corolla cream-colored, petals 6, the upper 2-3-lobed, lateral lobes acute, the lateral petals linear; capsules disk-like, 6-lobed, with a mamillary projection, at apex of which is the 3-fissured 3-dentate mouth — April to May

Var. **brevipes,** Post. Pedicels shorter than flower

FIG. 62

a b c

(*a*) Winged-angled branch of M. globulosa, with bract, padicel and 6-merous calyx; magnified 6 diameters.
(*b*) Upper petals; magnified 8 diameters.
(*c*) The 6-lobed capsule; magnified 2 diameters.

Ain-Hesbân and Araq-el-Amîr, Moab. A plant heretofore observed only in northern Persia.

† † *Sepals deciduous. Pods erect, medium. Seeds small.*

‡ *Lobes of upper petals* 7-9, *similar ; filaments persistent ; seeds pitted.*

9. R. stenostachya, Boiss. ⊙ .3, papillose-asperulous, grey. Lower and upper leaves linear, entire, intermediate ternate, with linear lobes. Flowers subsessile, *minute*, forming a long spike-like raceme ; sepals lanceolate, as long as corolla ; upper petals 9-lobed ; filaments *deciduous ;* capsules *minutely scabrous*, obovate-oblong ; seeds minute — Spring — Sinaitic valleys.

10. R. muricata, Presl. ② ♃ .3 to .5, muricate, rigid. Lower leaves entire, linear-lanceolate, the others ternate with linear to linear-lanceolate lobes. Flowers .004 broad, short-pedicelled, upper petals 7-lobed ; filaments *deciduous ;* capsules glabrous, elliptical, .005 to .01 long ; seeds minute — Spring — Hot valleys above Dead Sea, below level of Mar Saba, to Sinai.

Var. **undulata,** Post. Margin of leaves wavy — Hot rocks ; Wadi-Kelt.

‡ ‡ *Lateral lobes of upper petals minute, central obovate ; filaments deciduous ; seeds smooth.*

11. R. pruinosa, Del. ② .3, muricate, stiff. Leaves rigid, linear-lanceolate, *entire*, *a few* ternately cut. Flowers short-pedicelled in a spike-like raceme ; capsules *papillose*, *cylindrical-club-shaped* — Spring — Desert by south end of Dead Sea, et-Tîh, Sinai, and southward.

* *Flowers* 4-*merous. Pods* 3-*toothed. Leaves entire. Placentæ* 3-*lobed.*

12. R. Luteola, L. ② Dyer's Weed or Weld. .5 to 1, glabrous, stiff, branching from base. Leaves linear-lanceolate, often wavy, and often denticulate above base. Flowers nearly sessile ; sepals persistent, shorter than corolla ; filaments persistent ; fruiting raceme often .5 long ; capsules stiff, *obovate-truncate*, .005 long and broad, acutely toothed, *deeply* 6-*fluted*, *the lobes more or less knobbed by transverse constrictions ; seeds glabrous* — Spring and summer — Hills and roadsides ; south-west of Dead Sea, Haurân, Amanus and northward.

3. OLIGOMERIS, Cambess. Oligomeris.

Sepals 2-5. Petals 2, turned toward axis, entire or lobed. Disk none. Stamens 3, turned toward axis, somewhat monadelphous at base, the middle one between, the other two opposite the petals. Capsules chartaceous, gaping at apex, 4-grooved — Annual herbs with entire leaves, and minute sessile flowers in slender, spiked racemes.

O. subulata, Del. ⊙ .1 to .3, branching from base and above. Leaves linear, subulate. Pod oblate-spheroidal, .002 broad, glabrous, or papillose at back of carpels — Spring — Et Tîh and southward.

4. CAYLUSEA, St. Hilaire. CAYLUSEA.

Sepals 5, persistent, the upper smaller. Petals 5, the upper larger with many-parted limb. Stamens 10-15. Disk one-sided, upper border much dilated. Gynophore elongated, slender. Carpels free, whorled at apex of gynophore, boat-shaped, tapering, 1-celled, gaping toward axis ; margin of fissure ciliate, 1-seeded. Placentæ cushion-like, at apex of gynophore — Annual herbs, with aspect of Reseda Luteola, L., with entire leaves, and flowers in spike-like racemes.

C. canescens, L. ⊙ *Dhunâbah* .3 to .4, papillose-hairy, erect or ascending, branching from base and above. Leaves oblong to linear-lanceolate, often .04 to .05 long, spreading, often with wavy borders. Flowers short-pedicelled, bracts soon deciduous — Spring — Torrid valleys about Dead Sea, and southward to Arabia.

Var. **prostrata,** Post. *Prostrate.* Leaves .005 to .02 long, sparse — Sinai.

ORDER IX. CISTINEÆ. (ROCK-ROSE FAMILY).

Shrubs or herbs with regular flowers, distinct, hypogynous, indefinite stamens, a persistent calyx, caducous corolla, incompletely several-celled ovary, with as many parietal placentæ as valves, and orthotropous, albuminous seeds — Sepals 5, the outer two often bract-like, sometimes caducous, the other three a little twisted in the bud. Petals 5, twisted in the bud in a direction opposite to the sepals. Style simple.

* *Capsule incompletely* 5-10-*celled. Flowers pink or white, never yellow.*

1. CISTUS. All the stamens fertile.

* * *Capsule* 1- *or incompletely* 3-*celled. Flowers yellow, pink or white.*

2. HELIANTHEMUM. All the stamens fertile.

3. FUMANA. The outer stamens sterile, necklace-form.

1. CISTUS, L. ROCK-ROSE. LABDANUM. *Ladhanum.*

Sepals 3-5. Petals 5. Stamens numerous, all fertile. Capsule incompletely 5-10-celled, spliting down the middle of the valves ; placentæ next to the axis ; seeds orthotropous ; embryo spiral — Shrubs with large showy pink or white flowers, and wrinkled, exstipulate leaves.

1. C. villosus, L. ♄ *Ghibrah.* .3 to 1 or more, more or less viscid, *villous.* Leaves elliptical or obovate-oblong, often wavy. Flowers 3-5, with *short* peduncles, arranged in *umbel-like cymes ;* sepals nearly equal, ovate, *acuminate ;* petals *pink* with yellow base ; style *as long as ovary* — Spring — Shrubby hillsides ; throughout. *A drink resembling tea is made of its leaves.*

Var. **genuinus,** Boiss. Densely woolly, and villous with long hairs. Leaves large.

Var. **Creticus,** Boiss. *Sparingly* woolly. Leaves smaller.

2. C. incanus, L. ♄ .2 to .6 or more. Leaves oblong-spathulate, *densely pannous with, stellate wool*, often wavy-margined, sessile, *somewhat connate at base.* Peduncles short, *one-flowered ;* sepals nearly equal, ovate, *cuspidate ;* petals pinkish-purple, notched ; capsule *appressed bristly*, at length glabrescent — Summer — Amanus. *Not before observed in the East.* Differs markedly from Var. Creticus of last.

3. C. salviæfolius, L. ♄ *Ghibrah.* .3 to 1 or more, *appressed stellate-woolly.* Leaves oblong-ovate, ovate, or elliptical, the lower often retuse. Flowers solitary or in umbel-like cymes with *long* peduncles ; sepals *very unequal, the outer cordate,* larger than the rest ; petals *white* with yellow base ; stigma *sessile* — Spring — Rocky hillsides ; throughout.

2. HELIANTHEMUM, Pers. Sun-Rose.

Sepals 5 rarely 3. Petals 5. Stamens numerous, all fertile. Capsule 1- or incompletely 3-celled, splitting down the valves ; seeds orthotropous ; embryo folded, rarely spiral — Shrubs or herbs, with less showy flowers than Cistus, yellow, white, or pink ; leaves with or without stipules.

* *Sepals* 3. *Petals white or yellow. Stamens in several rows.*

1. H. umbellatum, L. ♄ .2 to .3, viscid. Leaves sessile, linear, revolute-margined, woolly below. Flowers 1-4 in umbels or whorls ; capsule enclosed in calyx, one-half to one-third as long as pedicel — April to June —

Var. **Syriacum,** Boiss. More intricately branched than type. Upper surface of leaf more or less hirsute. *Petals yellow* — Subalpine regions of Lebanon.

* * *Sepals* 5.

† *Annuals. Petals yellow, equalling the sepals or shorter. Stamens* 1 *row.*

2. H. guttatum, L. ⊙ .1 to .4, erect, sparingly hirsute. Leaves sessile, oblong to linear-lanceolate. Stem branching into 1-2 loose, one-sided racemes. Sepals hairy, the outer smallar — Spring — Sandy and bushy places on coast and in lower mountains. Moab.

3. H. Niloticum, L. ⊙ .3 to .5, erect, crisply hirsute, branching above. Leaves oblong to linear, obtuse or acutish. Racemes .1 to .2 long, loose ; pedicels thick, *shorter than floral leaves, and often shorter than caylx ;* capsules ovate-globular, .01 broad, glabrous, ciliate at angles — Spring — Dry and clayey soils ; coast and mountains. Moab.

Var. **microcarpum,** Cosson. Branching from base. Capsules .006 long, shorter than calyx — Ehedin; Qaldûn north of Damascus ; Rasheiya ; lower Jordan valley.

Var. **lasiocarpum,** Boiss. Capsule woolly — Sarada.

4. H. salicifolium, L. ⊙ .1 to .3, hirsute, branching from base. Leaves obovate to oblong, and lanceolate. Pedicels *longer than floral leaves and calyx ;* capsules ovate-globular, .005 long, glabrous, as long as ovate, velvety sepals — Spring — Dry hills ; throughout.

5. H. Ægyptiacum, L. ⊙ .15 to .3, appressed hairy. Leaves linear oblong, with somewhat revolute margin. Pedicels slender, at

length recurved, *shorter than calyx. Outer* 2 *sepals herbaceous, minute, inner* 3, *scarious, ovate-inflated, red-veined ;* capsule ovate-globular, .006 to .008 long, puberulent, shorter than sepals — Spring — Sandy places ; Judea and Moab, to Antilebanon, Aleppo, and northward.

† † *Perennials. Petals yellow, about as long as sepals. Stamens in* 1 *row.*

6. H. ventosum, Boiss. *Ra'r* ♃ .3 to .4, greenish stellate-puberulent, intricately branched. Leaves elliptical, with somewhat revolute margins. Racemes loosely 1-5-flowered ; pedicels half as long as calyx, at length recurved ; outer sepals *half* as long as *ovate* inner ones — Spring — Top of the Tîh chain, and southward. Doubtfully separate from var. depauperatum of next species.

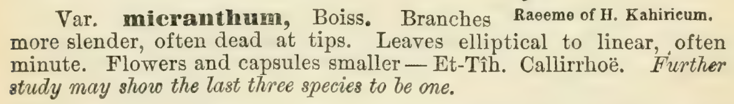
7. H. Kahiricum, Del. ♃ .15 to .3, ashy stellate-puberulent. Leaves oblong to linear, with revolute margins. Racemes dense, many-flowered ; pedicels *as long as, or shorter than calyx,* recurved — Spring — Et Tîh, and southward to Egypt.

Var. **depauperatum,** Post. Branches slender. Leaves small. Racemes *few-flowered, loose. Pedicels twice as long as calyx* — Callirrhoë to Sinai.

8. H. Lippii, L. ♃ .3 to .4, ashy stellate-canescent. Leaves elliptical to linear with revolute margins. Racemes dense, many flowered ; *flowers sessile or nearly so* — Spring — Sandy places along coast to Et-Tîh and southward.

Var. **ellipticum,** Boiss. Plant larger, leaves elliptical, and flowers more conspicuous — Sea coast and Sinaitic deserts.

Fig. 63.



Raceme of H. Kahiricum.

Var. **micranthum,** Boiss. Branches more slender, often dead at tips. Leaves elliptical to linear, often minute. Flowers and capsules smaller — Et-Tîh. Callirrhoë. *Further study may show the last three species to be one.*

† † † *Perennials. Petals* 2-3 *times as long as calyx. Stamens in* ∞ *rows.*

‡ *Petals yellow. Inner sepals* 3-*nerved. Racemes panicled.*

9. H. lavandulæfolium, Lam. ♃ .3 to .7, appressed stellate-canescent, branches erect. Leaves oblong to linear, with revolute margins, the younger clustered in the axils. Racemes dense, one-sided, *nearly opposite, paniculate, the upper often ternate* — Summer — Dry places ; coast range of mountains, and northward.

‡ ‡ *Petals pinkish, purple, white, or yellow. Inner sepals* 4-*nerved. Racemes simple. Fruiting calyx scarious, more or less inflated.*

10. H. vesicarium, Boiss. ♃ .15 to .25, *appressed-canescent.* Leaves oblong to linear, obtuse, margins revolute. Stipules linear, half as long as leaves. Racemes loose ; pedicels about as long as calyx ; *petals pinkish purple ;* nerves of inner sepals sparingly hispid — Spring

— Coast of southern Palestine and hill country of Judea and Moab, to borders of Et-Tîh, and southward.

11. H. Kotschyanum, Boiss. ♃ .2 to .4, *hispid.* Leaves linear, obtuse, margins revolute ; stipules linear, less than half as long as leaves. Racemes long, rather compact ; pedicels about as long as calyx ; *petals yellow ;* nerves of inner sepals *entirely* hispid — May and June — Cœlesyria to Aintâb, Marash, and northward.

12. H. vulgare, Gaertn. ♃ .2 to .3, greenish, more or less canescent. Leaves ovate-elliptical and ovate-oblong to oblong-linear, *margins little or not at all revolute ;* stipules linear, longer than petioles. Racemes loose, few flowered ; pedicels as long as calyx ; petals yellow, pink, or white ; flowers .015 broad — June and July — Northern mountains of Syria, and northward.

Var. **virescens,** Boiss. Leaves greenish above and below.

Var. **discolor,** Boiss. Leaves more or less canescent below.

Var. **grandiflorum,** Boiss. Lower leaves .025 long, .01 broad. Flowers .02 or more broad — Mt. Cassius.

3. FUMANA, Spach. FŪMANA.

As in last, except the outer rows of stamens, which are sterile, necklace-like. Flowers yellow.

* *Stipules* 0. *Flowers in loose, terminal racemes.*

† *Capsules* 12-*seeded.*

1. F. procumbens, Dunal. ♃ .2, appressed-puberulent, procumbent. Leaves alternate, sessile, linear, about .01 long, *alike.* Flowers 1-4 at apex of branches ; pedicels *as long as leaves*, at length reflexed ; seeds long adherent to valves — Summer — Aintâb and northward.

2. F. Spachii, Gren. et Godr. ♃ Erect. Leaves alternate, sessile, somewhat viscid, *the upper smaller.* Flowers, in axils of bract-like upper leaves ; pedicels 2-3 *times as long as leaves*, at length deflexed ; seeds separating from deciduous valves — Summer — Aleppo and northward.

† † *Capsules* 3-*seeded.*

3. F. oligosperma, Boiss. et Ky. ♃ .015, minutely glandular-puberulent, branches ascending. Leaves somewhat viscid, *linear-awl-shaped*, petioled, *remotely denticulate, the teeth ending in slender pellucid bristles ;* floral leaves much smallar. Pedicels recurved, longer than calyx — Summer — Woods ; Cassius and Amanus.

** *Leaves stipuled.*

† *Flowers* .02 *to* .03 *broad. Capsule* .006 *long ; seeds* 12, *wrinkled.*

4. F. Arabica, L. ♃ .2 to .3, more or less pubescent, viscid. Leaves *oblong to linear*, acute, the *lower much smaller*, *crowded.* Pedicels longer than calyx, at length recurved ; style slender, *bent below*, straight above — April to July — Dry hills and rocky places ; throughout.

† † *Flowers* .01 *broad. Capsules* .003 *long; seeds* 6, *somewhat netted.*

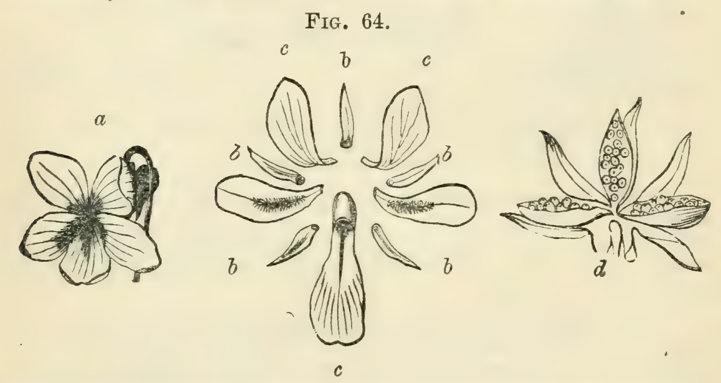
5. F. glutinosa, L. ♂ .15 to .25, minutely glandular-puberulent, viscid. Leaves *nearly all opposite, needle-like,* with revolute margins, the floral much shorter. Pedicels thread-like; nearly twice as long as calyx, spreading. Style straight, oblique — April to June — Dry hillsides and rocks; throughout.

Var. **viridis,** Boiss. Leaves longer, looser, glabrescent — Moab. Beirût. Cassius.

Order X. VIOLARIEÆ. (Violet Family).

Herbs, with 5 *persistent sepals, an irregular spurred corolla of* 5 *petals,* 5 *hypogynous stamens, with adnate, introrse anthers, connivent in a ring over the pistil, and a* 1-*celled,* 3-*valved pod, with* 3-*parietal placentæ. Seeds albuminous; embryo straight*—Leaves alternate, stipuled.

Fig. 64.



(*a*) Flower of a species of Violet. (*b, b, b, b, b,*) The five nearly regular sepals. (*c, c, c, c, c,*) The five irregular petals, the lowermost with a short spur. (*d*) Capsule opened, showing the seeds on the parietal placentæ.

VIOLA, L. Violet. Heart's-Ease. *Benefsej.*

Sepals nearly equal. Lower petal spurred. Filaments dilated, often projecting beyond anthers. Valves of capsule contracting elastically when open, and dispersing the seeds.

* *Perennials. Stigma capitate, glabrous.*

† *Stems not branched.*

1. V. Libanotica, Boiss. ♃ .05 to .1. Root *thick woody;* stems numerous tufted, *woody.* Leaves *rhomboid or ovate, with cuneate or cordate base,* .015 to .02 long, *coarse toothed;* stipules oblong-lanceolate, short-fringed. Flowers .01 broad; sepals oblong, rather acute; capsule globular, woolly — Summer — Subalpine and alpine Lebanon.

2. V. odorata, L. ♃ Sweet Violet, .1 to .15. Root *fibrous;* stems somewhat indurated. Leaves deeply *cordate, crenate,* .03 to .04 long, *those of summer stolons reniform-cordate;* stipules ovate-lanceolate, acute, fringed. Flowers .02 broad ; sepals obtuse ; capsule globular, pubescent — April to June.

Var. **Dehnhartii,** Boiss. Stipules more or less hirsute, long fringed — Woods ; central Palestine, and Gilead, to Lebanon, and northward.

Var. **suavis,** Boiss. Stipules linear-lanceolate, long fringed. Lower petal retuse — Woods ; northern Syria.

† † *Stems branched. Flowers as large as those of V. odorata.*

3. V. sylvatica, Fries. ♃. Wood Violet .25, nearly glabrous. Leaves reniform to cordate. Stipules lanceolate, acute, long-fringed. Flowers pale violet ; sepals lanceolate, acute ; capsule ovate, 3-angled — April to June — Woods; middle to subalpine zone of Lebanon.

* * *Annuals. Stigma urn-shaped, hairy at base.*

† *Pedicels with 2 small bracts beyond the middle, usually near flower.*

4. V. tricolor, L. ⊙ Pansy. .15 to .3, glabrescent or more or less hairy, branching from base and above. Leaves *crenate,* lower ovate-cordate, upper lanceolate, limb .01 to .04 long ; stipules pinnatifid ; lateral *lobes linear, middle oblong-spathulate, crenate.* Petals variegated, yellow, purple, and violet ; spur longer than appendices of calyx — Spring — Escaped from gardens.

5. V. parvula, Tin. ⊙ .05 to .1, villous-pubescent. Leaves *minute, nearly entire, the lower nearly round, the upper lanceolate to linear;* stipules 3-4-parted into linear lobes, the middle one longer, oblong. Petals white, with bluish base, *shorter than calyx;* spur *shorter* than appendices of calyx — Spring — Subalpine regions ; Jebel el Fughry (Lebanon) ; Antilebanon.

Var. **calcarata,** Post. Petals a little longer than sepals. Spur a little longer than appendices — Heights above Bludân, Antilebanon.

6. V. pentadactyla, Fenzl ⊙ .03 to .1, retrorsely scabridulous. Leaves entire, the lowermost round, the others *spathulate-oblong-linear;* stipules *bipartite, the inner lobe like the leaf and as long, the outer narrower and shorter.* Corolla blue, *twice* as long as calyx ; spur *twice* as long as appendices of calyx — Spring — Fields ; Antilebanon to Aleppo and Aintâb.

† † *Pedicels bractless. Spur of corolla shorter than appendices of calyx.*

7. V. occulta, Lehm. ⊙ .1, rough, or glabrescent. Leaves remotely somewhat crenate, lower ovate, upper oblong-spathulate or lanceolate ; stipules *half as long as leaf,* lanceolate, *pinnatipartite.* Sepals *large, growing; appendices large;* corolla *pale, shorter than calyx* — Spring — Samaria to subalpine Lebanon, Antilebanon, Cassius, Aintâb, and northward.

8. V. modesta, Fenzl. ⊙ .1 to .15, rather glabrous or pubescent. Leaves obsoletely crenate, the lowest round-ovate, the others oblong to linear-lanceolate ; stipules *much shorter than leaf,* linear-

lanceolate, *entire, or with a tooth at each side of base.* Sepals *half as long as blue* corolla —Spring — Mt. Cassius (from base to summit) to Marash, and northward.

9. V. ebracteolata, Fenzl. ⊙ .02 to .1, minutely puberulent. Leaves remotely crenulate, lowest round-ovate, upper oblong to lanceolate ; stipules *short*, oblong-linear, with 1-2 *teeth at each side of base.* Flowers *small ;* sepals *a little shorter than yellow* corolla — Spring — Subalpine Lebanon and Antilebanon to Aintâb, and northward.

ORDER XI. POLYGALACEÆ. (MILKWORT FAMILY).

Herbs or slightly shrubby plants with irregular hypogynous flowers, (in ours) 8 *monadelphous or diadelphous stamens, their* 1-*celled anthers opening at the top by a pore or chink* — Represented by the typical genus

POLYGALA, TOURN. MILKWORT.

Sepals 5, the outer three small, the inner two larger, wing-like. Petals 3, connate below and adnate to stamen tube, the lowest larger, keel-shaped, enclosing the stamens, with a winged crest on its back. Ovary 2-celled with a single anatropous ovule in each. Style simple. Capsule flattened laterally, 2-celled, loculicidal. Seeds hirsute, surrounded at base with a lobed aril.

* *Annuals. Stems nearly simple. Filaments monadelphous to middle.*

1. P. Monspeliaca, L. ⊙ .2 to .4, stems usually solitary. Leaves dense, lanceolate-linear, acuminate. Racemes long, ∞-flowered, terminal ; outer sepals lanceolate ; wings white, elliptical, 3-nerved, veins not anastomosing ; capsules *obovate*, notched, glabrous — Spring — Grassy places ; common to 1000 m.

* * *Perennials.*

† *Racemes becoming lateral by development of branches.*

2. P. supina, Schreb. ♃ .15 to .3, crisply puberulent ; stems numerous, filiform, *decumbent.* Leaves obovate to obovate-oblong acute. Racemes 5-15-flowered ; outer sepals boat-shaped ; wings obovate, somewhat stipitate, shorter than corolla, broader than capsule, *many-nerved ;* capsule *elliptical*, notched at apex, glabrous — May and June — Dry shady woods and rocks ; Galilee to Lebanon, Cœlesyria, Cassius and northward.

† † *Racemes terminal.*

3. P. pruinosa, Boiss. ♃ .15 to .3, greyish puberulent, woody at base, with ascending branches. Leaves obovate to elliptical and linear, *obtuse.* Racemes ∞-flowered, loose ; outer sepals oblong, *acute ;* wings oblong-obovate, oblique, 3-nerved ; capsule *somewhat broader* than wings, sessile, *obliquely obcordate*, glabrous — Summer — Mountains of Aintâb and Marash, and northward.

4. P. Anatolica, Boiss. et Held. ♃. .15 to .4, puberulent, stems numerous, clustered, erect. Leaves elliptical-linear, to linear *acute*. Racemes many-flowered, dense, at length loose ; outer sepals oblong *obtuse ;* wings obovate-lenticular, 3-5-nerved ; capsule *narrower* than wings, obcordate, stipitate, glabrous — April to June — Dry bushy places ; Mt. Cassius and northward.

ORDER XII. FRANKENIACEÆ. (FRANKENIA FAMILY).

Much branched, prostrate herbs or dwarf shrubs, with small, regular, hypogynous flowers, clustered in forks and at ends of branches ; stamens (in ours) 4-6, *free, their* 2-*celled anthers opening lengthwise ; ovary* 1-*celled, with* 3-5 *placentæ along the middle of the valves; ovules in* 2 *rows, anatropous* — Calyx gamosepalous, tubular. Petals clawed. Capsules septicidal. Seeds albuminous.

FRANKENIA, L. FRANKENIA.

Calyx 4-5-fid. Petals 4-5, pink. Style filiform, parted into 3-4-linear-club-shaped lobes, stigmatose along their inner face.

1. F. pulverulenta, L. ⊙ .1 to .3, *puberulent*. Leaves *obovate*, retuse, pulverulent beneath — Spring— Along coast and in neighborhood of salt water; El-Ghor ; Callirrhoë ; Merj Damascus.

2. F. hirsuta, L. ♃ .1 to .4, *more or less hirsute*, woody at base. Leaves *linear* or *oblong-linear*, ciliate at base, with revolute margins — Spring — Along coast.

Var. **hispida,** Boiss. Hispid with white spreading hairs.

Var. **revoluta,** Boiss. Canescent. Fruiting branches short, erect.

ORDER XIII. SILENEÆ, (PINK FAMILY).

Herbs or somewhat shrubby plants, with opposite, entire, exstipulate leaves, 5-, *rarely* 6-*merous flowers ; calyx gamosepalous ; petals clawed, generally convolute in the bud ; petals and stamens inserted on the stalk (gynophore) of the capsules ; stamens rarely equalling, never exceeding double the number of the petals, hypogynous or perigynous ; styles* 2-5 *; seeds usually numerous, attached to central column of the* 1- *or obsoletely* 2-*celled, stalked capsule, kidney-shaped with embryo curved around albumen, or shield-shaped with straight embrgo* — Stems usually swollen at joints. Leaves often united at base, the uppermost rarely alternate. Calyx imbricate or valvate in bud, persistent. Styles stigmatose along their inner face.

TRIBE I. **DIANTHEÆ.** Seeds shield-shaped, with hilum on face. Styles 2. Embryo straight.

* *Calyx tubular*, .001 *in diameter, with* 1 *linear-lanceolate bract at base.*

1. VELEZIA. Calyx 5-15-nerved, acutely toothed. Limb minute.

** *Calyx tubular, top-shaped, or obconical*, ,002 *or more in diameter.*

2. DIANTHUS. Calyx tubular, scaly at base, ∞-nerved.
3. TUNICA. Calyx top-shaped, tubular, or obconical, with 2 scales or naked at base, 5-15-nerved ; commissure membranous.

TRIBE II. **LYCHNIDEÆ.** Seeds kidney-shaped or nearly globular, with lateral hilum. Embryo peripheral or spiral.

* *Commissural nerves of Calyx* 0. *Styles* 2. *Embryo peripheral or curved.*

4. ACANTHOPHYLLUM. Shrubs with prickly leaves, and white, sessile flowers.
5. GYPSOPHILA. Calyx usually top-shaped or campanulate, usually 5-nerved, claws of petals usually not bilamellate.
6. ANKYROPETALUM. Nearly leafless perennial herbs, with intricate branches. Petals tripartite ; claws not bilamellate.
7. SAPONARIA. Calyx usually cylindrical or oblong ; nerves ∞. Claws of petals bilamellate.

** *Commissural nerves of calyx manifest. Embryo peripheral.*

† *Styles* 3. *Calyx usually club-shaped in fruit, often in flower.*

8. SILENE. Annual and perennial herbs, with various habit.

† † *Styles* 5. *Calyx oblong or cylindrical.*

9. MELANDRIUM. Perennial herbs. Calyx membranous, 5-toothed.
10. GITHAGO. Annuals. Calyx coriaceous, with 5 at length deciduous lobes.

1. VELEZIA, L. Velezia.

Calyx slender, tubular, acutely 5-toothed, 5-15-nerved. Petals 5, with elongated claw and small limb ; crown 0, or consisting of crisp hairs. Stamens 10 or 5. Torus not elongated. Capsule cylindrical, 4-toothed, few-seeded ; seeds with eccentric umbilicus and prominent radicle — Annual, dichotomous, rigid herbs, with awl-shaped leaves.

V. rigida, L. ⊙ *Dibbaiqah.* .1 to .3, glandular-hispid or glabrescent. Flowers *alternate or twin*, six times as long as thickened pedicels ; calyx .012 long, .001 in diameter, equally 15-nerved, somewhat angled ; limb bifid, naked or with a few hairs at base ; capsule about as long as calyx — May and June — Dry hillsides ; Galilee to Aintâb, and northward.

Var. **fasciculata,** Post. Flowers *clustered*, subsessile — Nusairy Mountains. Lebanon (*V. fasciculata*, *Boiss.*)

2. DIANTHUS, L. Pink. Carnation. Qurunful.

Calyx scaly at base, tubular, ∞-nerved, 5-toothed. Petals 5, with spreading, entire, dentate, or fringed limb, glabrous or hairy above. Stamens 10. Torus elongated into a gynophore. Capsule cylindrical or ovate, ∞-seeded, 4-toothed. Umbilicus central. Embryo eccentric — Herbs, mostly perennial, with grass-like leaves, and showy flowers.

* *Calyx more or less striate and minutely warty. Scales* 4-6.

† *Annuals. Calyx striate to base. Scales* 4.

1 D. tripunctatus.

† † *Perennials. Calyx tube striate only from sinus downward. Scales* 4-6.

2 D. multipunctatus, 3 polycladus.

* * *Calyx striate, but not warty.*

† *Limb white, yellowish, or pink, entire, crenate or dentate, but never fringed or bearded.*

‡ *Scales* 4 *or less.*

4 D. pallens, 5 Judaicus, 6 Auraniticus.

‡ ‡ *Scales* 4-8.

7 D. lactiflorus, 8 floribundus.

† † *Limb pink or white, fringed, glabrous or bearded at base.*

‡ *Scales* 4-8.

9 D. Libanotis, 10 superbus, 11 fimbriatus, 12 pogonopetalus.

‡ ‡ *Scales* 10-16, *imbricated, elongated from lowest to highest.*

13 D. Sinaicus.

† † † *Limb pink or purple, dentate, always bearded. Involucre not scarious.*

‡ *Scales* 10-12.

14 D. pendulus.

‡ ‡ *Scales* 4-10.

15 D. actinopetalus, 16 zonatus, 17 hypochlorus.

† † † *Limb pink or purple, dentate, generally bearded. Flowers capitate; involucre scarious, long-awned.*

18 D. calocephalus.

§ 1. VERRUCULOSI.

1. D. tripunctatus, Sibth. ⊙ .3 to .4, glabrous, erect, with spreading branches. Leaves somewhat rigid, membranous-margined, ciliate at base, those of branches appressed, with setaceous tip. Flowers solitary at apex of rigid, somewhat incurved branches ; scales 4, ovate, with broad, membranous margin, *tapering into awl-shaped, rigid, appressed awns, a little shorter than calyx ;* calyx-teeth lanceolate ; limb obovate-cuneate, dentate, 3-*lined* at base — May and June — Fields ; Acre.

2. D. multipunctatus, Ser. ♃ .3 to .5, glabrous, or somewhat pubescent at base ; stems ascending, simple or sparingly stiff-branched at apex. Leaves ciliate at base, with scabrous margin. Flowers .02 broad, nearly solitary ; calyx .015 to .02 long ; scales 4-6, scarious, pale, ovate, obtuse, *ending in a slender, short, appressed awn ;* limb pink, *obovate-wedge-shaped, dentate, generally dotted with deep crimson spots* —May to July — Common in dry and rocky places.

Var. **gracilior,** Boiss. Stems slender — Beirût. Amanus to Aintâb.

Var. **axilliflorus,** Boiss. Stems racemose, owing to the subsessile, nearly solitary, lower flowers — Lebanon.

Var. **pruinosus,** Post. Indument pruinose — Lebanon ; Khan Hhathrurah to Jericho.

Var. **subenervis,** Boiss. Calyx-teeth almost destitute of nerves — Lebanon.

3. D. polycladus, Boiss. ♃ .2 to .5, glabrous, or velvety below; stems numerous, slender, dichotomous, with stiff, slender, elongated branches. Leaves stiff, scabrous, those of branches short, narrow, scale-like. Flowers terminal, solitary, .01 broad ; scales scarious, ovate, *mucronate ;* calyx .006 to .01 long ; limb pale pink, *oblong-linear, entire or retuse* — Summer — Lebanon and Hermon to Amanus and Akherdagh, to 1500 m.

Var. **diffusa,** Post. Stems prostrate or ascending, .15 to .2 — Alpine Lebanon.

§ 2. LEIOPETALI.

4. D. pallens, Sibth. ♃ .3 to .4, glabrescent, glaucescent. Stems erect, simple, more or less paniculate-corymbose. Leaves linear, with scabrous margins, sheaths short, knotted. Flowers .02 broad, without bracts, or subtended by the upper pair of leaves ; scales ovate, acute, *tapering or mucronate;* calyx .015 to .02 long, *somewhat tapering at apex;* teeth oblong-lanceolate ; limb obovate-cuneate, crenate or dentate — May and June — Dry hillsides ; Antilebanon to Amanus and northward.

Var. **oxylepis,** Boiss. Glaucous. Scales acuminate, the outer often lanceolate *with spreading cusp,* sometimes only 2 — Cœlesyria and Antilebanon to Palmyra, Aleppo, and nothward and eastward.

5. D. Judaicus, Boiss. ♃ .2 to .3 glaucous, *papillose-scabrous, tufted ;* stems generally 1-flowered. Leaves linear, acute, recurved, *plicate-keeled, with membranous margin.* Flowers .02 broad, somewhat remote from upper leaves ; scales glabrous, oblong, *somewhat spreading at apex, tapering abruptly into a green, acute, ascending cusp ;* calyx thrice as long as scales, .025 long ; teeth lanceolate, acute ; limb oblong, nearly entire — May — Hot hillsides around Dead Sea.

6. D. Auraniticus, Post. (Trans. Linnean Soc., Lond., 1888, p. 426) ♃ .3, glabrous, glaucescent ; stems sparingly branched. Leaves linear, plicate, *narrowly scarious-margined,* the lower imbricated, dilated at base. Flowers solitary ; scales .01 to .013 long, oblong-lanceolate, membranous-margined, abruptly tapering into an *ascending or spreading cusp, half as long as calyx tube ;* calyx .02 to .03 long, with triangular-lanceolate, mucronate teeth ; limb obovate-spathulate, sparingly dentate — May and June — Fields ; between Irbid and Bosrah, Haurân. Further study required to establish the differences between D. pallens, var. oxylepis, Boiss, D. Judaicus, and this species.

7. D. lactiflorus, Fenzl. ♃ .3 to .5, glabrous, woody at base, with many, simple or sparingly branched, 3-5-flowered stems. Leaves linear, *scabrous at margin,* the lower .06 to .1 long. Flowers .02 broad; scales 4, appressed, about one-third as long as calyx-tube, *ovate-elliptical,* membranous-margined, tapering into a *short* cusp or mucro ; calyx

.02 to .03 long, teeth lanceolate ; limb *whitish*, obovate, entire or dentate — Summer — Amanus and northward.

Var. **macrolepis,** Post. Scales 8, lanceolate, nearly half as long as calyx-tube — Woods above Karah-Jurn, northern Cassius.

Var. **brachylepis,** Boiss. Scales 8, *mucronate* — Aintâb.

8. D. floribundus, Boiss. ♃ .3 to .5, many-stemmed from an indurated rootstock ; stems panicled-corymbose to simple, 1-2-flowered. Leaves rigid, linear, with scabrous margins, 3-5-nerved, lateral nerves at margin. Flowers .01 broad ; scales 4-6, white-margined, mucronate, oblong, two-fifths as long as .02 long calyx-tube ; calyx-teeth lanceolate, white-margined ; limb *pale-pink*, oblong, *deeply toothed* — Summer — Marash and northward. Too near D. Anatolicus, from which it differs principally in its *dentate* not *crenate* limb.

Var. **pruinosus,** Boiss. Lower leaves and stems pruinose — Aintâb, Marash, and northward.

Var. **Kerhanicus,** Post. Indument as in last. Stems 1-2-flowered — Kerhân, near Marash.

§ 3 FIMBRIATI.

9. D. Libanotis, Labill. ♃ .3 to .6, stems *thick*, *angular*, *stiff*, corymbose, rarely simple. Leaves glaucous, linear-lanceolate, often 5-nerved, the radical rather obtuse, the stem leaves .006 to. 008 broad, acute, often spreading recurved. Flowers 2-3 together, rarely solitary, .02 broad ; scales .01 to .02 long, ovate, *tapering into a lanceolate, recurved, spiny tip ;* calyx tube .03 long, with lanceolate teeth ½ its length ; limb pale, obovate-cuneate, reddish spotted at base, fringed to its middle — May to July — Mt. St. Catherine, Sinai. Alpine Lebanon. Jebel Qulêb, Haurân. Table land of Damascus and northward.

10. D. superbus, L. ♃ .6 or more, stems usually single, more or less paniculate or corymbose above. Leaves linear-lanceolate, 3-5-nerved, the upper acuminate. Flowers .02 or more broad, usually solitary. Scales ovate, *mucronate*, one-third as long as .02 long calyx-tube ; calyx-teeth lanceolate, *mucronate ;* limb pink, *purple bearded, fringed nearly to base* — Summer — Cœlesyria. Perhaps escaped from cultivation.

11. D. fimbriatus, M. B. ♃ .2 to .3, many-stemmed, woody at base ; stems erect, slender, simple, rarely stiff-branched. Leaves .01 to .03 long, *linear awl-shaped,* scabrous-margined. Flowers .02 broad, solitary ; scales oblong, mucronate, one-third to one-half as long as .02 long calyx-tube ; calyx-teeth lanceolate, mucronate ; limb pink, *glabrous or bearded at base*, fringed to half its length — August and September — Alpine regions of Amanus and northward.

Var. **brevifolius,** Boiss. Leaves very short. Limb elongated, long-bearded — Cedars of Lebanon.

12. D. pogonopetalus, Boiss. et Ky. ♃ Many-stemmed, woody at base ; stems ascending, 1-*flowered.* Leaves linear, rigid, 3-nerved, *shorter than joint.* Scales oblong, abruptly acuminate, with narrow membranous margins, one-third as long as .02 long calyx-tube ;

calyx-teeth lanceolate, ciliate at base ; claws exserted ; limb pink, oblong-spathulate, fringed to *less than half* its length — Summer— Lebanon, near Besherri and Cedars. Too near the last.

13. D. Sinaicus, Boiss. ♃ *Sammah.* .3 to .4, glaucous, shrubby at base ; *stems much branched, dichotomous.* Radical leaves few, fugacious, awl-shaped, scabrous-margined ; *stem leaves reduced to an appressed cusp* 3-4-*times as long as sheath.* Flowers solitary ; scales 10, closely appressed, ovate, white margined, tapering into a short point, one-third as long as .025 to .03 long, calyx-tube ; calyx-teeth lanceolate, acute ; limb glabrous, *oblong, a little broader than claw*, fringed for *three-fourths* its length — August — Rocks at base of Sinai.

§ 4. DENTATI.

14. D. pendulus, Boiss. et Bl. ♃ .4 to .6, many-stemmed from a woody base ; stems with few, stiff branches. Leaves linear, acuminate, somewhat rigid, more or less 5-nerved, *scabrous-margined.* Flowers .02 to .03 broad, pedicelled, solitary, or 2-3, clustered ; scales 8-10, oblong-lanceolate, acute, the uppermost one-third to one-half as long as .02 to .025 long, calyx-tube ; calyx-teeth lanceolate, acute ; limb obovate, *digitate-incised* to one-fourth its length — September — Hanging from cliffs ; Lebanon. Doubtfully separated from the following.

15. D. actinopetalus, Fenzl. ♃ .3 to .4, shrubby at base ; stems stiff, simple or branched. Leaves linear, acuminate, 5-7-nerved, *not scabrous-margined*, the radical long, flexuous. Flowers 2-3, clustered, rarely solitary ; scales 8-10, ovate, acute, somewhat herbaceous, one-fourth as long as .02 long, calyx-tube ; calyx-teeth oblong-triangular, acute ; claw exserted ; limb obovate, *cut-toothed* — Summer — Rocks ; Antioch, and northward.

16. D. zonatus, Fenzl. ♃ .3 to .4, tufted from an indurated root-stock ; stems erect, simple or stiff branched. Leaves 5-nerved, rigid, acuminate. Flowers usually scarious-bracted ; scales 4, with membranous margin broader above, ovate, mucronate, one-third as long as .02 long calyx-tube ; calyx-teeth lanceolate, mucronate, *usually purple-zoned at base, yellow beneath,* acutely *denticulate* — Spring — Fields ; Moab.

17. D. hypochlorus, Boiss. et Held ♃ .1 to .2, tufted ; stems simple or slightly branched. Root-leaves .01 to .02 long ; stem leaves linear, grooved, 3-nerved, scabrous. Flowers *solitary*, bracted or naked at base ; scales 4, straw-colored, white margined, *tapering into a cusp*, one-third as long as .012 long calyx-tube ; calyx-teeth lanceolate, ciliate ; limb oblong-spathulate, acutely denticulate, half as long as calyx — Summer —

Var. **Karami,** Bl. Leaves more flaccid ; scales herbaceous ; calyx green, red above — Lebanon, base of Qurnat-es-Sa'adah, Dhunnîyeh.

§ 5. CARTHUSIANI.

18. D. calocephalus, Boiss. ♃ .1, nearly glaucous. Leaves flaccid, 5-nerved ; sheath appressed, *many times longer than diameter*

of stem. Heads of flowers .03 to .04 broad ; flowers .01 broad ; scales oblong, one-third as long as calyx-tube, *tapering abruptly into awns one-third to one-half their length ;* calyx-teeth lanceolate, acuminate ; limb, *brick-red*, obovate-cuneate, dentate — Summer — Rocky places about Antioch and northward.

3. TUNICA, Scop. TUNICA.

Calyx scaly at base or naked, top-shaped or tubular, 5-toothed, 5-15-ribbed, the commissures membranous. Petals 5, with elongated claw, and entire, retuse, or bifid limb, destitute of crown. Stamens 10. Torus small. Capsule oblong, many-seeded, 4-toothed. Seeds shield-shaped with nearly central umbilicus. Embryo eccentric — Slender, rigid, small-flowered herbs, with grass-like leaves.

* *Calyx scarious, at length inflated, scaly at base.*

1. T. velutina, Guss. ⊙ .2 to .5, *more or less velvety ;* stems erect, simple. *Sheaths of leaves elongated margins not scabrous ;* leaves and scales of involucre mucronulate, with or without dots. Limb small, scarcely exserted, bifid, pink ; seeds boat-shaped, tubercled — March and April — Coast and coast range to 800 m. Too near T. prolifera, L.

* * *Calyx involucrate, obconical, not scaly at base,* 5-15-*nerved.*

T. Syriaca, Boiss. ② .15 to .25, glabrous, green, many-stemmed, shrubby at base ; stems filiform, rigid, nearly simple, 1-flowered. Leaves scabridulous, linear, acute, those of stem short, stiff. Bracts of involucre *nearly as long as calyx,* linear-lanceolate, acute, *with a thick red nerve ;* calyx .008 long, teeth obtuse with a stout nerve ; limb pink, linear, entire — June — Rocks near Antioch. Pobably a variety of T. saxifraga, L., which Tristram claims to have found in and about Lebanon.

* * * *Calyx obconical, not involucrate or scaly at base,* 5-*ribbed, membranous between the ribs, ribs* 3-*nerved.*

3. T. pachygona, F. et M. ⊙ .2 to .4, glandular-viscid ; stem erect, dichotomous-paniculate. Leaves 8-nerved, linear-awl-shaped. Peduncles stiff, as long as or longer than the .007 long, obconical, *glabrous* calyx ; calyx-teeth ovate, mucronate with an excurrent midrib ; petals white, sometimes reddish beneath, linear-spathulate, entire, somewhat exserted during the maturing of the fruit — April to June— Lebanon and Antilebanon to Aleppo, Aintâb, and northward and eastward.

Var. **scabrida,** Post. Calyx *scabrous,* especially along nerves ; teeth rather shorter — Arabia Petræa to El-Ghor, Moab, and Cœlesyria. (*T. Arabica, Boiss*).

4. ACANTHOPHYLLUM, C. A. Mey. ACANTHOPHYLLUM.

Calyx tubular or turbinate. 5-toothed, 5-15-nerved. Petals 5, with long, bilamellate claw, tapering gradually into limb. Stamens 10, with exserted anthers, the 5-opposite the petals somewhat shorter. Gynophore short. Ovary 1-celled, 4-10-ovuled, with hemispherical or short cylin-

drical placenta. Capsule 1-seeded by abortion, nearly indehiscent, membranous below, chartaceous above. Seeds ovoid, kidney-shaped. Embryo curved or peripheral — Perennial shrubs, with prickly leaves and white, sessile flowers.

A. Tournefortii, Fenzl. ♄ .3, somewhat scabrous ; branches slender, simple or paniculate. Flowers clustered in sessile or short-peduncled heads disposed in pairs in the upper axils, or terminal ; bracts straight, as long as calyx ; calyx-teeth prickly ; limb linear-cuneate, retuse, exserted — September — Mountains of northern Syria.

5. GYPSOPHILA, L. Gypsophila.

Calyx top-shaped or campanulate, rarely cylindrical, membranous between the 5 nerves. Petals 5, limb naked at base, claw usually not bilamellate. Torus small. Capsule globular or ovate. rarely oblong, deeply 4-valved. Seeds kidney-shaped, affixed by a marginal umbilicus. Embryo peripheral — Herbs, rarely shrubs, differing much in aspect.

1. G. venusta, Fenzl. ♃ .5, stems terete, thickened at nodes, ending in a glabrous, hemispherical panicle. Leaves oblong-lanceolate, acuminate from a *rounded* base, .04 long, .007 broad at base, somewhat 3-nerved, rough-margined ; bracts herbaceous, with narrow margins. Pedicels capillary, 4-6-times as long as calyx ; calyx .004 long, *campanulate*, with round-ovate teeth ; *claw somewhat exserted ;* limb pink, purple at base, obovate-cuneate, retuse, *twice* as long as calyx — May — Thickets ; Aleppo to Aintâb, and northward.

Fig. 65.



(*a*) Calyx of G. Rokejeka, magnified 3 diameters. (*b*) Petals, stamens, and pistil, magnified 3 diameters.

2. G. Rokejeka, Del. ♃ *Ruqueqah Kuzâmah. Barabihh. Sirr.* .4 to .6, glabrous, glaucescent, woody below ; stems slender, whitish, dichotomously panicled from base. Leaves fleshy, 1-nerved, with papillose margins, the lower *oblong-lanceolate*, obtuse, the others *linear-lanceolate*, acute, often channelled. Bracts linear, *herbaceous ;* pedicels capillary, 4-6-times as long as calyx ; calyx campanulate, .002 long, divided to three-fourths its length into oblong, white-margined lobes ; petals pink to violet, elliptical-oblong, twice as long as calyx — March to May — Dry places ; Palmyra to Jerusalem, Moab, and southward to Arabia and Egypt.

3. G. Libanotica, Boiss. ♃ .15 to .3, glaucous, woody at base, stems numerous, slender, branching into oblong, sometimes viscid panicles. Leaves fleshy, rigid, *oblong-lenticular*, .01 long, .003 broad, reticulate. Bracts oblong-lanceolate, scarious-margined ; pedicels capillary, 3-4 times as long as calyx ; calyx campanulate, .002 long, acutely dentate from middle ; limb pink, shorter than calyx — July to September — Rocks ; Alpine Lebanon, Berytdagh and northward.

4. G. Aucheri, Boiss. ♃ .6 to 1, green ; stems slender' branching into a glandular, rarely glabrous panicle. Leaves rigid' tubercled, oblong to linear-lanceolate .03 to .05 long, .002 to .004

broad. Bracts linear, scarious ; pedicels setaceous, 2-3 times as long as calyx ; calyx .0015 long, campanulate, *white-tubercled*, teeth ovate, obtuse, membranous-margined ; limb pink, oblong, somewhat shorter than calyx — July and August — Akherdagh and northward.

5. G. Damascena, Boiss. ♃ .3 to .4, glabrous ; stems slender, ending in a glabrous, rarely glandular panicle. Leaves fleshy, oblong, .01 to .015 long, .002 to .004 broad, acute, 3-nerved, the lateral nerves marginal anastomosing with the intermediate. Bracts minute, lanceolate, scarious ; pedicels setaceous, 4-6 times as long as calyx ; calyx campanulate, .002 long, teeth oblong, obtuse, membranous-margined ; limb *white*, as long as calyx — June and July — Dry hills ; Um-Jemâl (Moab) to Damascus, Antilebanon, and northward.

6. G. ruscifolia, Boiss. ♃ .8 to 1, glabrous ; stems slender. erect, leafy below, ending in a diffuse, sometimes glandular panicle, Leaves coriaceous, *ovate or oblong*, .01 to .012 long, acute, 5-7-nerved, strongly netted-veined, those of the sterile branches rounded at base, those of stem *deeply cordate or connate at base.* Bracts *awl-shaped with red midrib ;* pedicels capillary, 3-6 times as long as calyx ; calyx campanulate, .0015 long, red-nerved, teeth ovate, scarious-margined, obtuse ; limb pink, linear, nearly twice as long as calyx — June — Lebanon, Cœlesyria, and Antilebanon, to Aintâb and northward.

Var. **latifolia,** Post. Leaves triangular-ovate, *broader than long*, truncate at base and connate.

7. G. elegans, M. B. ⊙ or ♃ .3 to .4, glabrous ; stem corymbose-panicled. Lower leaves small, *oblong-spathulate*, the others *linear-lanceolate*, acute. Bracts minute, scarious ; pedicels capillary, *many times as long as calyx ;* calyx hemispherical, .002 long, teeth ovate, obtuse, scarious-margined ; limb pink, linear-wedge-shaped, truncate, retuse, 2-5 times as long as calyx — May to July — Moist places ; Sinai.

8. G. viscosa, Murr. ⊙ .15 to .3, glabrescent below, viscid above ; stem flexuous, dichotomous almost from base, corymbose-paniculate. Leaves slightly connate, *oblong-lanceolate*, .01 to .04 long, .003 to .01 broad, acuminate. Bracts minute, triangular-acuminate, scarious ; pedicels setaceous, 3 to 4 times as long as calyx ; calyx hemispherical, .0015 long, teeth ovate, obtuse, scarious-margined ; limb pink, wedge-shaped, truncate-retuse, longer than calyx — May and June — Haurân to Damascus, and northward.

9. G. ortegioides, F. et Mey. ♄ .2 to .5, minutely pruinose ; stems numerous, flexuous, much branched. Leaves *awl-shaped* .005 to .015 long. Bracts *awl-shaped*, *green ;* flowers *sessile*, *forming terminal racemes ;* calyx *obconical-tubular*, .004 long, teeth lanceolate, acute, limb obovate, white, purple-veined, half as long as calyx — September — Ziaretdagh (Amanus) and northward.

10. G. frankenioides, Boiss. ♃ .3, glandular-puberulent ; stems prostrate, tufted ; branches slender. Leaves *clustered*, *awl-shaped* .005 long. Flowers *mostly solitary in the upper and terminal axils ;* pedicels somewhat shorter than the sparingly hairy, tubular-campanu-

late, .005 long calyx ; calyx-teeth oblong, membranous-margined, obtuse ; limb wedge-shaped, pink, a little longer than calyx-teeth — June to September —

Var. **Libanotica,** Boiss. More viscid. Flowers often more numerous at the apex of the branches ; pedicels often somewhat longer than calyx — Alpine and subalpine Lebanon.

11. G. hirsuta, Labill. ♃ .1 to .3, velvety-hispid, somewhat shrubby at base ; stems *brittle*, slender, decumbent, dichotomously and sparingly branched. Leaves fleshy, *linear-spathulate or oblong-elliptical*, tapering at base, .005 to .008 long. Alar flowers short-pedicelled, terminal 3-5, sessile, capitate ; calyx *tubular-campanulate*, .004 to .006 long, with acute teeth ; limb obovate, white, a little longer than calyx teeth — April to October —

Var. **alpina,** Boiss. .03 to .05 high, tufted, velvety. Flowers terminal, 2-7, crowded — September and October — Alpine regions of Lebanon, Antilebanon, and Jebel Katarina (Sinai).

Var. **mollis,** Boiss. Soft-hispid. The alar and terminal flowers 2-5, clustered — Lebanon near Ehedin.

Var. **Barradensis,** Boiss. Greenish. Flowers nearly solitary ; pedicels somewhat longer than .003 long calyx — Suq-Wadi-Barada.

Var. **filicaulis,** Boiss. Velvety-canescent ; stems elongated flexuous, branching. Leaves ovate-oblong. Alar flowers clustered — Dry places ; Cœlesyria to Damascus and Palmyra.

12. G. porrigens, L. ⊙ .3 to .6, *hispid-viscid ;* stem erect, thickish, dichotomous, ending in a diffuse, corymbose panicle. Leaves firm, *oblong-lanceolate to linear-lanceolate and linear*, 3-nerved, the largest .07 long, .015 broad. Pedicels capillary, at length spreading-reflexed, 3-4 times as long as oblong-campanulate, .006 long calyx ; calyx becoming spherical in fruit, teeth oblong, obtuse, white-margined ; limb wedge-shaped, white, as long as calyx ; *capsule as large as a pea* — June — Fields ; Antilebanon to Qaldûn, and northward and eastward.

6. ANKYROPETALUM, Fenzl. ANKYROPETALUM.

Calyx cylindrical, 5-nerved, membranous between nerves. Petals 5, inserted on the upper margin of a sessile, cup-shaped disk, deeply 3-parted, with a naked claw tapering gradually into the limb. Stamens exserted. Ovary 8-9-ovuled. Capsule ovate or oblong, 1-celled, papery, irregularly 4-valved. Seeds hanging by elongated funicles after decay of capsule, kidney-shaped, with concentric, granular wrinkles — Perennial, glabrous, nearly leafless herbs, with filiform branches, and aspect of Gypsophila Rokejeka.

* *Intermediate lobe of petal bifid,* 1-*dentate near base.*

1. A. gypsophiloides, Fenzl. ♃ .6 to 1, intricate, diffusely panicled. Leaves few, fleshy, awl-shaped, triquetrous, the lower .02 long, the upper very short. Pedicels capillary, 3-6 times as long as .004 long, *puberulent* calyx ; calyx-teeth rounded, obtuse ; claw linear-cuneate, exserted — Summer — Mahardi to Aintâb, and northward.

2. A. Arsusianum, Ky. ♃ .6, stems slender, rigid, *simple, rarely with short alternate branches above.* Leaves few, very short, linear, acutish, *flat above, convex beneath.* Pedicels 2-3 times as long as *glabrous* .003 long calyx ; calyx-teeth ovate, obtuse — June to September — Rocky places ; Amanus and Akherdagh.

3. A. Reuteri, Boiss. et Haussk. ♃ .4 to .8 ; stems slender, dichotomously or alternately branched. Leaves short, linear, acute. Pedicels 2-4 times as long as .003 long, campanulate, glandular-hispid calyx ; calyx-teeth ovate, obtuse — July to September — Kapuchamdagh and Akherdagh.

* * *Intermediate lobe of petals not bifid, and not toothed at base.*

4. A. Cœlesyriacum, Boiss. ♃ .3 to .6, intricately branched into a *diffuse panicle.* Leaves few, short, fleshy, the lower linear, the upper awl-shaped. Pedicels once and a half to twice as long as puberulent .003 to .006 long calyx — June and July — Waste places ; Cœlesyria and Antilebanon.

7. SAPONARIA, L. Soapwort.

Calyx cylindrical or oblong-cylindrical, with numerous, generally obscure nerves. Petals 5, with narrow, bilamellate claw, limb generally distinct from claw, scaly or naked at base, often expanded. Stamens 10. Torus small or elongated into a carpophore. Ovary generally many-ovuled, with a cylindrical placenta. Capsule obovate or oblong, rarely globular, splitting into 4 short valves or teeth. Seeds kidney-shaped or nearly globular, affixed by a marginal umbilicus.

* *Inflorescence consisting of opposite, pseudoverticillate cymes.*

1. S. nodiflora, Boiss. ② ? 1, glabrous ; branches somewhat whorled, slender. Lower leaves oblong-spathulate, obtusely 5-7-nerved, .06 to .07 long ; stem-leaves lanceolate, acute. Flowers minute ; calyx membranous between ribs, viscid, cylindrical, with short, lanceolate teeth ; limb somewhat exserted, linear-cuneate, retuse ; capsule as large as a pea, bursting the base of the calyx, half its length — Between Behesne and Malatia (northern Syria.)

* * *Inflorescence loose, dichotomous-corymbose.*

2. S. Vaccaria, L. Cowherb. ⊙ .2 to .5. Lower leaves tapering at base, the others cordate-lanceolate. Calyx-teeth *triangular*, scarious-margined ; claw somewhat exserted ; limb pink, obovate, half as long as calyx — Spring — Fields ; everywhere.

3. S. oxyodonta, Boiss. ⊙ As in last except the *acuminate* calyx-teeth, and smaller limb of the corolla — Fields ; common. Probably a variety of the last.

* * * *Inflorescence paniculate, or densely corymbose, or cymose.*

† *Limb of petal scaly, distinct from claw.*

4. S. pulvinaris, Boiss. ♃ .03 to .15, *densely tufted, matted ;* stems dichotomously 3-7-flowered or simple, 1-flowered. Leaves *small,*

the radical crowded, *linear*, .005 long .001 broad, obtuse ; stem-leaves longer. Inflorescence hirsute-viscid ; longer pedicels as long as the .006 long calyx; limb shorter than, capsule as long as, calyx — Summer and Autumn — Alpine Lebanon and Antilebanon.

5. S. officinalis, L. ♃ Soapwort. Bouncing Bet. *Shersh-Hhalâwi.* .6 to 1, glabrous. Leaves *oblong-elliptical*, 3-nerved .05 to .1 long, .02 to .04 broad. Cymes *crowded, corymbose-paniculate;* pedicels short; limb pink, entire, retuse or bifid, nearly as long as .02 long calyx ; capsule shorter than calyx — Summer — Cultivated for its saponaceous root, which is used in washing woollens, as it does not cause them to shrink, and also in the manufacture of Hhalâwi.

6. S. glutinosa, M.B. ② .6 to 1, *glutinous-hispid.* Root-leaves spathulate to obovate-spathulate, .1 long ; stem-leaves *ovate-oblong*, acute. Cymes forming a *pyramidal-panicle ;* pedicels very short ; limb purple, bifid, *linear*, less than half as long as .02 long calyx ; capsule shorter than calyx — May and June — Woods near Hassan Beyley (Amanus), and northward.

7. S. Mesogitana, Boiss. ⊙ .15, pubescent-viscid, dichotomous-corymbose. Lower leaves oblong-spathulate, obtuse, 3-nerved, the floral linear-lanceolate. *Inflorescence dense ;* limb pink, obovate, half as long as calyx, tapering at base ; fruiting pedicels erect-spreading ; capsule oblong — May — Alpine regions of northern Syria.

8. S. prostrata, Willd. ② .1 to .3, papillose-canescent, *scarcely viscid ;* stems *decumbent*, dichotomously branched. Leaves spathulate to oblong-linear. Inflorescence densely corymbose ; pedicels very short ; limb pink, oblong-spathulate, entire, one-fourth as long as .012 long, purplish or greenish calyx ; capsule small, spherical, as long as carpophore, included in the inflated fruiting calyx — Summer — Alpine regions of northern Syria.

† † *Limb of petal naked, tapering gradually into claw.*

9. S. tridentata, Boiss. ♃ .3 or more, viscid ; stem erect, dichotomous from base. Leaves oblong, 1-nerved, the upper lanceolate. Corymb loose ; pedicels longer than .01 long calyx, in fruit spreading ; limb pink, obovate-cuneate, *trifid to half its length* into triangular-linear, acute lobes — Spring — Base of Akdagh, Northern Syria.

10. S. Syriaca, Boiss. ② Loosely pubescent-viscid ; stem dichotomously branched. Lower leaves oblong, obtuse, somewhat 3-nerved, the upper elliptico-linear. Corymb loose ; pedicels erect, somewhat shorter than calyx ; claw exserted; limb pink, cuneate-truncate, *bifid for half its length* — Syria ; place not noted (Boissier).

8. SILENE. L. Catchfly. Campion.

Calyx tubular 10-60-nerved. Petals 5, clawed, with appendage (rarely 0) at apex of claw. Stamens 10, of which 5 are adnate to petals. Ovary 3-celled at base, many-ovuled. Capsule borne on a carpophore, with 3 rudimentary cells at base, or 1-celled throughout, 6-valved at apex. Seeds kidney-shaped — Annual or perennial herbs.

FIG. 66.

Structure of flower of a Silene.

(*a*) Pedicel.

(*b*) Carpophore, or stalk of the ovary.

(*c*) Ovary, with central placenta, and numerous ovules.

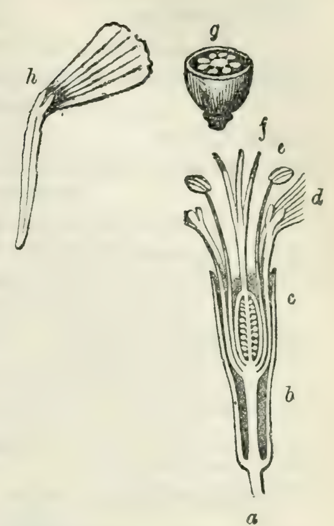
(*d*) Part of petal showing the base of limb, and the two appendages which aid in forming the crown.

(*e*) A stamen, its base united to the base of the petal.

(*f*) The three stigmas about the length of the single style.

(*g*) Transverse section of ovary, showing the central placenta, and the numerous ovules.

(*h*) A petal entire, showing claw, appendages, and limb.



SERIES A. ANNUALS.

SUBSERIES I. Calyx 20-60-nerved, ovate cylindrical, or club-shaped, in fruit contracted at apex.

* *Calyx* 20-*nerved.*

1 S. coniflora.

* * *Calyx* 30-*nerved.*

2 S. conoidea.

* * * *Calyx* 60-*nerved.*

2 S. macrodonta.

SUBSERIES II. Calyx 10-nerved, cylindrical or club-shaped. Capsule 3-celled at base.

* *Inflorescence dichotomous. Calyx glandular, apex contracted in fruit.*

4 S. noctiflora.

* * *Inflorescence capitate. Calyx glabrous, apex not contracted in fruit.*

5 S. compacta, 6 Reuteriana.

* * * *Inflorescence dichotomous, cymose or racemose. Branches not filiform.*

† *Calyx glabrous, apex contracted in fruit.*

7 S. muscipula, 8 Behen.

† † *Calyx hirsute or papillose; apex contracted in fruit.*

‡ *Calyx beset with dilated papyraceous papillæ along the nerves.*

9 S. squamigera.

‡ ‡ *Calyx scabrous-bristly or hirsute along the nerves.*

§ *Inflorescence regularly dichotomous.*

19 S. crassipes.

§ § *Lower flower alar, the others in 1-sided racemes.*

11 S. dichotoma, 12 oxyodonta.

§ § § *All the flowers in 1-sided racemes.*

13 S. Gallica,

* * * * *Flowers in 1-sided racemes. Calyx hirsute or papillary, apex not contracted in fruit..*

† *Seeds with flat face and obtusely grooved back.*

14 S. Nicæensis, 15 hirsuta, 16 villosa.

† † *Seeds with ear-shaped depression at face and obtusely grooved back.*

‡ *Capsule a little longer than carpophore.*

17 S. Arabica, 18 setacea,

‡ ‡ *Capsule 1-3 times as long as carpophore.*

19 S. Damascena, 20 Palestina.

‡ ‡ ‡ *Carpophore almost 0.*

21 S. nocturna.

† † † *Face of seeds smooth, rather concave, back deeply grooved with two wavy wings.*

22 S. apetala, 23 bipartita.

* * * * * *Inflorescence dichotomous, ending in racemes or cymes. Calyx hairy or glabrous, apex not contracted in fruit. Tender herbs.*

† *Seeds more or less compressed.*

24 S. rubella, 25 sedoides, 26 fuscata.

† † *Seeds almost globular, with a pore at each side of umbilicus.*

27 S. Atocion.

* * * * * * *Inflorescence irregularly dichotomous. Apex of calyx not contracted in fruit. Rigid plants with filiform branches and peduncles.*

† *Seeds grooved at back.*

28 S. Kotschyi, 29 linearis, 30 Cassia, 31 Hussoni.

† † *Seeds flatish at back.*

32 S. juncea, 33 chætodonta.

SERIES B. PERENNIALS.

* *Flowers small, 1-5 in a raceme. Capsule short-stipitate. Tufted dwarf, subalpine and alpine plants.*

34 S. pharnaceifolia.

* * *Flowers rather small; calyx not more than .01 long; diœcious or monoecious-polygamous, rarely hermaphrodite. Carpophore elongated.*

35 S. stenobotrys, 36 brevipes, 37 spergulifolia, 38 pruinosa, 39 Montbretiana.

* * * *Flowers hermaphrodite, often large.*

† *Flowers at top of stem; calyx .02 to .03 long; claws auricled, Low alpine plants.*

40 S. stentoria, 41 Tejedensis.

† † *Inflorescence dichotomous, cymose, or racemose; calyx membranous, in flated .013 to .015 long.*

‡ *Petals bifid.*

42 S. odontopetala, 43 inflata, 44 commutata.

‡ ‡ *Petals fringed.*

45 S. physalodes.

† † † *Inflorescence paniculate.*

46 S. Italica, 47 Astartes, 48 Amana, 49 leucophylla, 50 longipetala.

† † † † *Inflorescence dichotomous or 1-flowered.*

‡ *Calyx membranous, glabrous, club-shaped in fruit.*

51 S. swertiæfolia, 52 Schimperiana, 53 Libanotica, 54 Porteri.

‡ ‡ *Calyx membranous, hirsute, scarcely club-shaped in fruit.*

55 S. gigantea, 56 grisea.

† † † † † *Inflorescence axillary, racemose. Fleshy, maritime plants.*

57 S. succulenta.

† † † † † † *Flowers 1-2. Stems slender. Leaves linear or subulate.*

58 S. Schlumbergeri,

§ 1. CONOIMORPHÆ.

1. S. coniflora, Otth. ⊙ .1 to .2, viscid-puberulent. Leaves grass-like, linear-lanceolate to linear, tapering. Calyx umbilicate at base, conico-cylindrical, with teeth one-third as long as tube, in fruit ovate-oblong; limb of pink or whitish corolla obovate-cuneate, entire; capsule .01 long, ovate-conical, sessile — April to May — Fields; Aleppo to Hums, Palmyra, Damascus, Moab and southward, and eastward.

2. S. conoidea, L. ⊙ .2 to .4, pubescent-viscid. Leaves oblong-lanceolate, acute. Calyx conico-cylindrical, umbilicate at base, teeth lanceolate-subulate *one-third* as long as tube, in fruit globular-inflated at base; limb pink, obovate, entire, or eroded-denticulate; capsule .02 long, sessile, globular, tapering abruptly into, a long conical apex — Spring — Fields; common.

Var. **obcordata,** Boiss. Limb larger, obcordate.

Var. **grandiflora,** Post. Limb large, obovate-cuneate, eroded-denticulate.

3. S. macrodonta, Boiss. ⊙ .3 to .4, velvety-canescent, viscid above. Leaves oblong-linear to linear, acute. Calyx truncate at base, cylindrical, with lanceolate-subulate teeth *half* as long as tube, in fruit inflated; limb pink, obcordate; capsule .02 long, short-stipitate, globular, tapering into a long, conical apex — Spring — Fields; common. Doubtfully separated from last by 60-nerved calyx. Intermediate forms are to be sought.

§ 2. MELANDRIFORMES.

4. S. noctiflora, L. ⊙ .5 to 1, pubescent, viscid above. Lower leaves obovate to oblong, upper lanceolate. *Cyme few-flowered;* calyx truncate at base, with awl-shaped teeth one-third as long as tube ; limb pale pink, yellowish below, bifid ; carpophore short ; capsule *ovate* — Summer — Woods ; middle zone of Amanus and northward.

§ 3. COMPACTÆ.

5. S. compacta, Horn. ② .3 to .6, glabrous, glaucescent ; stem thick, simple or sparingly branched above. Lowest leaves spathulate-lanceolate, the others *oblong to oblong-ovate, connate at base* ; leaves of involucre oblong-ovate. Flowers sessile ; calyx club-shaped from umbilicate base, teeth ovate, obtuse, greenish ; limb pink, obovate, entire ; capsule oblong, *half as long as carpophore* — Summer — Shrubby places ; Amanus.

6. S. Reuteriana, Boiss. ② .6 to .8, glabrous, glaucescent ; stem with opposite, slender branches almost from base. Lower leaves crowded, somewhat connate, *lanceolate-linear*, acutish, the others *very short, linear.* Flowers subsessile, *the lower generally solitary at the apex of the branches*, the terminal capitate ; calyx club-shaped, teeth ovate, obtuse ; limb pink, wedge-shaped, bilobed ; capsule oblong, somewhat shorter than carpophore — Summer — Sandy places ; Lebanon, about 1000 m.

S. Armeria, L., said by Tristram to grow along the coast. It is probably an escape from gardens.

§ 3. LEIOCALYCINÆ.

7. S. muscipula, L. ⊙ .3 to .5, glabrous, viscid above. Leaves oblong-spathulate to linear-lanceolate, the floral awl-shaped, as long as or longer than calyx. *Inflorescence dichotomous ;* all the flowers short-peduncled ; calyx club-shaped from an umbilicate base, teeth triangular, *acute*, white-margined ; limb small, cuneate, 2-lobed ; capsule oblong-elliptical, once and a half to twice as long as carpophore — Spring — Fields, along coast.

FIG. 67.



Fruiting calyx of alar flower of S. muscipula.

8. S. Behen, L. ⊙ .3 to .4, glabrous, glaucescent. Leaves obovate, acute, to oblong-lanceolate. Alar flowers peduncled, the upper *loosely racemed, subsessile ;* calyx oblong from umbilicate base, *with reddish veins, in fruit inflated, ovate*, teeth ovate, obtuse, membranous-margined ; limb pink, minute, *bipartite almost to base* into obovate-oblong lobes ; capsule ovate, *short-stipitate* — Spring — Fields and rocky places ; common.

§ 4. LASIOCALYCINÆ.

9. S. squamigera, Boiss. ⊙ .3 to .5, pubescent-scabrous ; stems dichotomously panicled almost from base. Leaves oblong-spa-

thulate to linear. Flowers short-pedicelled, in one sided racemes ; calyx .012 to .015 long, club-shaped from umbilicate base, whitish ; scales with 1-4, oblong, obtuse teeth ; limb white, deeply obcordate ; capsule ovate, a little shorter than carpophore — May — Fields ; Aintâb to Marash.

10. S. crassipes, Fenzl. ⊙ .3 to .4, scabrous or scabridulous with elevated dots, pubescent. Leaves oblong-spathulate to lanceolate-linear, the floral often equalling or overtopping the calyx. Flowers subsessile, the alar solitary, the terminal more or less densely cymose, 3-5 ; calyx cylindrical from umbilicate base, *scabridulous with conical papillæ, especially along nerves*, in fruit *club-shaped*, teeth *ovate, obtuse*, membranous ; limb minute, *purple, linear-cuneate*, retuse ; capsule ovate, *less than thrice as long as carpophore* — Fields ; common. (Includes *S. gonocalyx, Boiss.*, see supplement to Fl. Or. Boiss. p. 92).

FIG. 68.



Terminal cyme of S. crassipes, with somewhat densely cymose terminal flowers.

11. S. dichotoma, Ehr. ⊙ .3 to .5, puberulent ; stem *stiff, dichotomous.* Leaves spathulate to linear, acuminate. Peduncles very short; calyx more or less *hirsute with bristly papillæ* along the green, prominent nerves, oblong-cylindrical, *in fruit oblong*, teeth short, lanceolate, acute ; limb *white, bipartite beyond its middle* into ovate-oblong lobes ; capsule oblong, with short carpophore — Spring — Galilee. Gilead.

Var. **racemosa,** Boiss. *Canescent* with crisp hairs. Racemes *loose*, long. Bracts membranous. Capsule ovate — Spring — Fields to 1000 m ; much commoner with us than type. (*S. racemosa, Otth.*)

Var. **glabrescens,** Post. Glabrescent.

12. S. oxyodonta, Barbey. ⊙ .3, sparingly puberulent with crisp hairs. Leaves oblong-spathulate to oblong-linear, the upper somewhat clasping. Fowers subsessile, *solitary ;* calyx with broad, green, sparingly pubescent nerves, and lanceolate, acute teeth, *ending in a recurved tip ;* limb *purple*, oblong, *bifid*, into ovate, obtuse lobes ; capsule *twice* as long as carpophore — April — Plain of Esdraëlon.

13. S. Gallica, L. ⊙ .3 to .4, sparingly hirsute, viscid above ; stem simple or dichotomous. Leaves obovate-spathulate to oblong or oblong-linear, upper awl-shaped. Lower flowers peduncled, upper subsessile ; calyx rounded at base, cylindrical, *in fruit ovate*, with *lanceolate-subulate, somewhat recurved* teeth ; limb pink or white, obovate, entire, retuse, or denticulate ; capsule *subsessile* — Spring — Fields and hillsides ; not rare to 1000 m.

§ 5. BIPARTITÆ.

14. S. Nicæensis, all. Ped. ⊙ to ② .3 to .4, papillose-viscid. Leaves fleshy, linear-oblong obtuse, to linear acute. Flowers in compound racemes or irregularly cymose, more or less peduncled ; calyx

cylindrical, with umbilicate base, *in fruit club-shaped*, teeth lanceolate, *ciliate;* limb white, greenish-purple below, cuneate, bifid; capsule ovate, a little longer than carpophore — Summer — An imperfect specimen, apparently of this species, was found by the writer in the sands at Lattakia, in June, 1884.

15. S. hirsuta, Lag. ⊙ .3 to .4, *hirsute*, especially above; stems sparingly divaricate from base. Leaves linear-lanceolate, to subulate. Racemes .2 to .3 long; lower flowers peduncled, upper sessile; calyx *viscid-villous*, cylindrical, in fruit club-shaped, with green nerves and oblong, obtuse, *ciliate* teeth; limb *whitish*, oblong-cuneate, bifid into oblong lobes; capsule oblong, a little longer than carpophore — April — Mountains of Moab. (*S. hispida, Desf.* in Tristram's Fauna and Flora of Palestine is probably this species, which is distinguished from S. hispida, among other things, by the absence of alar flowers).

16. S. villosa, Forsk. ⊙ *Nimwâr. A'tâni. Dhunâbah.* .1 to .15, *papillose-viscid;* stems numerous, procumbent, leafy. Leaves *fleshy, spathulate*, rather obtuse. Flowers irregulary cymose, or all loosely racemed; peduncles shorter than .01 to .02 long, cylindrical calyx, reflexed in fruit; calyx in fruit cylindrical-club-shaped, umbilicate at base, teeth ovate, obtuse; claws *long exserted;* limb white, deeply 2-parted, with obovate lobes; capsule oblong, somewhat longer than carpophore — Spring — Debbet-er-Ramleh, and southward to Sinai and Egypt.

17. S. Arabica, ⊙ .1 to .3, loose-hairy, glandular-viscid; stems erect, *slender, nearly simple.* Leaves *oblong to linear;* bracts linear, *short, unequal.* Racemes loose; peduncles *as long as calyx*, reflexed in fruit; calyx whitish, green-nerved, cylindrical, in fruit oblong, .01 long, teeth triangular, obtuse, ciliate; claw exserted; limb bipartite; capsule ovate — Spring — Sands; Sinai.

18. S. setacea, Viv. ⊙ .1 to .25, appressed-puberulent; stems erect, rigid, simple or dichotomous from base. Leaves *plicate, linear-subulate, acutish;* bracts *oblong-linear*, short, nearly equal. Peduncles short; calyx appressed pubescent, with pale green nerves, cylindrical, in fruit club-shaped, teeth lanceolate, acutish; claws somewhat exserted; limb white, *parted to base* into linear lobes; capsule ovate — Spring — Around the Dead Sea, and southward to Egypt.

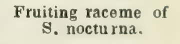
19. S. Damascena, Boiss. et Gaill. ⊙ .3, viscid-pubescent; stem erect, dichotomously branched. Leaves oblong obtuse, to linear-lanceolate acutish. Lower peduncles longer than calyx, upper very short; bracts unequal; calyx sparingly glandular, reddish, red-nerved, tapering-cylindrical, in fruit club-shaped, teeth oblong, obtuse; limb *whitish, bifid to middle;* capsule oblong, *once to twice* as long as carpophore — Spring — Middle Lebanon and Antilebanon; Beirût; Nabatîyeh; Jerusalem (Includes *S. siderophila*, Boiss. et Gaill., and may better be referred to the following).

20. S. Palæstina, Boiss. ⊙ .3 to .4, sparingly hispid-viscid; stem erect, simple or dichotomous below. Leaves oblong-linear to

lanceolate, obtuse or acutish. Racemes .1 to .3 long, stiff ; peduncles shorter than calyx, the upper very short ; bracts unequal ; calyx membranous, red nerved, tapering-cylindrical from truncate base, in fruit club-shaped, teeth oblong, obtuse ; limb *purple, bipartite to base ;* capsule oblong, *twice to thrice* as long as gynophore — Spring — Sandy places along coast, from Jaffa southward to Ramleh in the Tîh.

21. S. nocturna, L. ⊙ .3 to .4, puberulent ; stem erect, simple or sparingly branched. Leaves spathulate to oblong or oblong-linear, acute. Raceme loose ; lower peduncles as long as calyx or longer, the others shorter; bracts somewhat unequal, longer than peduncles; calyx .01 long, *oblong in flower and fruit,* tapering at base, teeth lanceolate, acute ; limb small, *whitish, livid below,* cuneate, bifid ; capsule oblong, sessile — Spring — Coast, and coast range to **1000** m.

Fig. 69.



Fruiting raceme of S. nocturna.

Var. **prostrata,** Post. Prostrate ; calyx green-veined — Ras Beirût.

22. S. apetala, Willd. ⊙ .2 to .3, appressed-pubescent ; stem erect, simple or dichotomous. Leaves oblong-linear to linear-lanceolate. Flowers loosely racemose, *the upper irregularly cymose ;* peduncles longer than .008 long, green, *campanulate, in fruit obovate,* calyx ; calyx teeth lanceolate, acute ; petals 0, or *minute, included, denticulate ;* capsule *globular,* sessile — Spring and Summer —

Var. **Orientalis,** Boiss. Fields ; Wadi Kelt ; top of wall of Jerusalem ; sandy places near Duma, Lebanon.

23. S. bipartita, Desf. ⊙ .2 to .4, appressed-pubescent ; stems ascending or procumbent at base, rarely erect, simple or dichotomous. Leaves obovate obtuse, to oblong-linear acute ; bracts small, oblong-lanceolate, unequal. Peduncles shorter than .02 long calyx ; calyx red-nerved, obconical-cylindrical from umbilicate base, *in fruit club-shaped,* teeth *oblong, obtuse ;* limb pink, bifid into obovate or linear lobes ; capsule ovate, *once to twice* as long as carpophore — Spring — Sandy places along coast.

Var. **Oliveriana,** Post. Leaves often narrower. Calyx green-nerved. Limb *white* or *pale pink,* with linear lobes. (*S. Oliveriana, Otth. S. colorata, Poir.*)

Var. **longipes,** Post. Capsule shorter than carpophore — Not uncommon.

Var. **stenophylla,** Boiss. Leaves linear-oblong to linear. Stems 1-few-flowered — Palestine to Sinai.

§ 6. ATOCIEÆ.

24. S. rubella, L. ⊙ .3 to .5, *puberulent, glaucescent;* stems unequally dichotomous. Leaves obovate-spathulate to linear, obtuse. Peduncles of alar flowers rather long, of the *more or less cymose,* terminal ones short; calyx membranous, oblong, *in fruit top-shaped,* teeth rounded, obtuse, ciliate; limb pink, obovate-cuneate, retuse; capsule ovate, 2-3 times as long as carpophore — Spring — Hûleh; Haurân; Damascus.

FIG. 70.



Cymes of S. rubella.

25. S. sedoides, Jacq. ⊙ .2 to .3, *viscid-hirsute,* branching from base, dichotomous. Leaves fleshy, oblong-spathulate to oblong. Flowers axillary, *racemose above;* lower peduncles longer than calyx, *all nodding after flowering;* calyx .007 long, oblong from umbilicate base, in fruit club-shaped, teeth short, obtuse; limb small, obovate, retuse; capsule membranous, oblong as long as calyx, *four times as long as carpophore* — Spring — Sands; along coast.

26. S. fuscata, Link. ⊙ .3 to .8, *viscid-pubescent;* stems erect. Leaves *oblong to oblong-lanceolate.* Alar peduncles much longer than calyx, terminal short, cymose; calyx oblong-obconical from umbilicate base, in fruit club-shaped, teeth ovate, obtuse; limb pink, cuneate-obovate, *entire;* capsule ovate, *about as long as carpophore* — Spring — Fields; along coast.

27. S. Atocion, Murr. ⊙ .2 to .3, *crisp-puberulent;* stems ascending, dichotomous. Leaves *ovate, the lower with margined petioles,* obtuse, the upper sessile, acute. Alar flowers short, peduncled, terminal nearly sessile, cymose; calyx *red, obsoletely nerved,* cylindrical from umbilicate base, in fruit club-shaped, teeth membranous-margined, ovate, obtuse; limb pink, *bilobed, with a tooth on each side at base;* capsule oblong, *somewhat shorter than carpophore* — Spring — Fields; throughout to 1500 m. The commonest and most showy of all the species in our district, often covering a large space with its pretty, .02 broad flowers.

§ 7. RIGIDULÆ.

28. S. Kotschyi, Boiss. ⊙ .1 to .3, *pruinose-viscid;* stem slender, branches filiform. Leaves plicate, linear-awl-shaped, mucronate, ciliate at base. Peduncles long, filiform; calyx *with prominent red nerves,* cylindrical from a tapering, umbilicate base, in fruit club-shaped, teeth ciliate, lanceolate, acuminate; limb pink, cuneate, bifid; *lobes of crown rounded;* capsule ovate, somewhat exserted from calyx, and longer than carpophore — Summer — Sandy places; middle zone of Lebanon and Antilebanon, Cœlesyria, Aintâb, Marash, and northward and eastward.

Var. **striata.** Glabrous-viscid. Calyx striate between nerves. Lobes of crown lanceolate, acute — Lebanon; Cœlesyria. (*S. striata, Ehr*).

Var. **maritima,** Boiss. Internodes short — Sandy places ; Suedîyah to Lattakia.

29. S. linearis, Decaisn. ⊙ .3 to .5, *glaucescent*, pubescent, rarely glabrous, viscid above ; stem dichotomous. Leaves lanceolate to linear-subulate. Upper peduncles often shorter than calyx ; calyx *green nerved, cylindrical-club-shaped, in fruit abruptly constricted at base of capsule*, teeth triangular, acute, white-margined, limb white, nearly 2-parted into linear-lobes ; capsule ovate-oblong, shorter than carpophore — April and May — Arabia Petræa to Egypt.

30. S. Cassia, Boiss. ⊙ .6, *rough-papillose below*, glabrous-viscid above, dichotomous, branches rigid, panicled. Leaves linear-lanceolate tapering at base, to linear-plicate, acute. Peduncles longer than calyx ; calyx appressed-papillose, green-nerved, oblong-club-shaped, teeth lanceolate, acute ; limb whitish, wedge-shaped, bipartite ; capsule oblong, somewhat longer than carpophore — June — Woods ; Cassius.

31. S. Hussoni, Boiss. ⊙ .04 to .07, *hirtellous, viscidulous*, dichotomous. Leaves oblong-lanceolate to linear. Peduncles longer than calyx ; calyx *top-shaped*, .004 long, *netted veined*, with triangular, membranous-margined teeth, *one-third its length ;* limb white, bifid into linear lobes ; capsule ovate, *twice* as long as carpophore — Spring — Borders of et-Tîh and southward.

32. S. juncea, Sibth. ⊙ or ♃ .3 to .6, *minutely tubercled-puberulent* below, glabrous, green, viscid above ; branches elongated, slender, paniculate-corymbose. Root-leaves rather large, *obovate, petioled, intermediate linear-lanceolate, floral linear-setaceous.* Peduncles *much shorter* than calyx ; calyx glabrous, .015 long, *red-nerved*, netted-veined at apex, umbilicate at base, cylindrical-obconical, in fruit club-shaped, teeth triangular, tapering at apex ; limb showy, white or pink, *purplish netted below*, bipartite into obovate-oblong, obtuse lobes ; capsule ovate, *shorter* than carpophore — Throughout the year — Common along coast and lower coast range of mountains. An immature specimen found by the author in the Judean desert seems to belong to this species.

33. S chætodonta, Boiss. ⊙ .3 to .5, puberulent-scabrous below, glabrous-viscid above ; stem slender, loosely dichotomous-corymbose. Leaves linear, acute. Peduncles longer than calyx ; calyx glabrous, or hairy at the *prominent green nerves*, cylindrical-club-shaped. in fruit oblong-club-shaped, with lanceolate, scabrous teeth ; limb pink, bipartite to middle ; capsule ovate, *twice to thrice as long as* carpophore, *shorter than calyx* — June — Sands along Phœnician coast.

Var. **modesta,** Boiss. Capsule exserted — Beirût.

§ 8. **OTITEÆ.**

34. S. pharnaceifolia, Fenzl. ♃. .03 to .1, tufted from a thickish root stock ; stems slender, 1-5-flowered. Leaves villous, grooved, awl-shaped, obtuse, the radical densely clustered ; bracts lanceolate, membranous at base. Calyx .007 long, reddish, slightly

puberulent, *obconical-campanulate, in fruit ovate*, teeth ovate, obtuse ; claws dilated, limb obcordate-bilobed ; capsule ovate, *short-stipitate* — June — Subalpine and alpine Lebanon.

§ 9. SPERGULIFOLIÆ.

35. S. stenobotrys, Boiss. et Haussk. ♃ .3 to .5, pruinose, with numerous, erect, slender stems. Leaves subulate, ciliate at broad base. Cymules 1-3-flowered, short-peduncled, forming a loose, viscid raceme, .1 to .2 long ; teeth of glandular-hairy, ovate, .007 long calyx oblong, obtuse ; limb white, biparted almost to base into linear lobes ; filaments *hirsute, long-exserted ;* capsule small, ovate, acute, 2-3-times as long as obconical carpophore — May and June — Chalky districts ; Antilebanon about Rasheyah and Mar Elias to Aintâb and Marash, and north-eastward.

36. S. brevipes, Paine. ♃ .2 to .3, puberulent ; stems many, diffuse, from a thick, woody base. Leaves small, firm, lanceolate, acute. Cymes spiciform, few-flowered, simple or forked ; flowers small, distant, solitary or twin ; calyx puberulent, cylindrical, .005 long, 5-nerved ; filaments glabrous ; limb small, round, notched ; gynophore almost 0 — April — Southern slopes of Jebel Siâghah (Moab.)

37. S. spergulifolia, Desf. ♃ .2 to .3 ; scabrous-pubescent, tufted, stems ascending. Leaves *linear-subulate*, rigid, *recurved*, ciliate at base. Cymules with short and stiff peduncles, forming *short, terminal, interrupted, often capitate racemes ;* calyx .009 long, glandular-hairy, cylindrical-obconical, in fruit club-shaped, with acute angles, teeth ovate obtuse ; limb white, with linear lobes ; filaments glabrous ; capsule rounded at base, conical, tapering, twice or thrice as long as carpophore —

Var. **elongata,** Boiss. .3. Racemes loose, elongated — Mt. Akdagh (Northern Syria.)

38. S. pruinosa, Boiss. ♃ .2 to .3, grey, retrorsely puberulent, shrubby at base ; stems ascending, *panicled*, branches of panicle often alternate. Leaves .01 to .015 long, *somewhat spathulate.* Calyx .01 to .015 long, glandular, cylindrical-obconical, in fruit club-shaped, teeth ovate, obtuse ; limb white, with linear lobes ; capsule slightly punctate, oblong-conical, once *to twice as long as* carpophore — June — Dry hills ; Cassius and Amanus to Aintâb, and northward.

Var. **alpina,** Boiss. Stems .1 to .2, few-flowered — Amanus and northward.

39. S. Montbretiana, Boiss. ♃ .2 to .3, grey, velvety ; base shrubby, stems erect, simple or stiff-branched. Leaves 1-nerved, *oblong to linear-lanceolate*, the lowest often obtuse, the rest acute, the floral oblong-triangular. *Cyme terminal*, 1-3-*flowered*, with *short peduncles ;* calyx .01 long, glandular-hairy, *campanulate*, in fruit club-shaped, teeth ovate, acutish ; claw 1-toothed on each side ; lobes of the *yellow* limb short, ovate ; capsule oblong, *as long as carpophore* — May — Mountains above Aintâb, and northward.

§ 10. AURICULATÆ.

40. S. stentoria, Fenzl. ♃ .1 to .15, velvety, glandular, shrubby at base, tufted, stems 1-2-flowered. Leaves rigid, *subulate, often falcate.* Calyx .03 long, netted-veined, club-shaped, teeth oblong, obtuse ; claws exserted ; limb white, small, bifid ; capsule oblong, about as long as or shorter than carpophore — Summer — Top of Lebanon, between Dîmân and Yamûni.

41. S. Tejedensis, Boiss. ♃ .04 to .06, densely glandular-hairy ; stems slender, prostrate, naked. Leaves *oblong-lanceolate,* acute or rather obtuse. Flowering branches short, leafy, 1-2-flowered at apex ; peduncles short ; calyx .02 long, green-nerved, cylindrical-club-shaped, teeth ovate, obtuse ; limb flesh-colored, bifid to middle into oblong lobes ; capsule oblong, shorter than carpophore — Summer — Gravelly places ; alpine Lebanon and Antilebanon.

§ 11. INFLATÆ.

42. S. odontopetala, Fenzl. .15 to .25, *pubescent, glandular, villous above ;* stems leafy, nearly simple. Leaves oblong to lanceolate, acute or obtuse. Flowers 1-7 ; calyx whitish, *campanulate,* .012 long, with broad, triangular, acuminate teeth ; limb white ; capsule ovate, somewhat shorter than calyx, *as long as or longer than* carpophore — Summer — Alpine Lebanon and Antilebanon.

Var. **rubella,** Post. Calyx reddish — Top of Sunnîn.

43. S. inflata, Sm. ♃ .3 to .5, *generally glabrous,* glaucescent. Leaves oblong to lanceolate, acuminate. Calyx *ovate,* umbilicate at base, with broad, triangular, acute teeth ; limb white ; capsule ovate-globular, included, narrower than calyx, *three to five times* as long as carpophore — March to June — Fields ; common throughout.

44. S. commutata, Guss. ♃ .3 to .5, glabrous, glaucous. Leaves ovate or elliptical, the lowest sometimes ciliate, the intermediate acute, often heart-shaped at base. Calyx ovate, umbilicate at base, teeth broad triangular ; capsule ovate, included, narrower than calyx, *thrice* as long as carpophore — June — Mountains near Marash, and northward.

§ 12. FIMBRIATÆ.

45. S. physalodes, Boiss. ♃ .1 to .2, hirtulous ; stem thick, hollow, leafy, paniculate above. Leaves .1 to .12 long, tender, ovate, the lower long-petioled, subcordate at base, the others cuneate at base, acuminate. Fruiting peduncles deflexed ; bracts cordate-acuminate to oblong, large ; calyx *cylindrical,* in fruit campanulate, teeth triangular, ciliate ; claws dilated ; limb white, linear, *fringed into* 4-6, *bristly lobes ;* capsule ovate, much smaller than calyx, scarcely longer than carpophore — June — Bushes ; Banias.

§ 13. PANICULATÆ.

46. S. Italica, L. ♃ .3 to .5, tomentellous-canescent, viscid above ; neck bearing short sterile twigs, and erect stems, ending in

panicles. Lower leaves ovate or oblong-spathulate, tapering into a petiole, upper lanceolate to linear. Calyx *pubescent-glandular*, .02 long, obconical-cylindrical, in fruit club-shaped, teeth triangular, obtuse ; limb white, bifid to or below middle into oblong-spathulate lobes ; capsule oblong-ovate, *once and a half to twice* as long as carpophore — Summer — Fields ; lower and middle zones of mountains.

47. S. Astartes, Bl. ♃ .2 to .25, sparingly pubescent-viscid ; stems erect. Leaves puberulent, pale green, those of sterile stems ovate-oblong, acute, petioled, those of fertile linear. Flowers 3-5 ; calyx .02 long, red-veined, *glabrous*, obconical-cylindrical, in fruit club-shaped, teeth oblong, obtuse, white-margined ; limb white, deeply bilobed ; capsule oblong, *as long as or twice as long as* carpophore — Summer — Ruins ot Afka ; Ain Sofâr (Lebanon.) Too near the last.

§ 14. VIRIDIFLORÆ.

48. S. Amana, Boiss. ♃ .6 to 1, green, pubescent, glandular-viscid above ; stem leafy. Leaves petioled, ovate-oblong, acutish. Flowers of depauperated panicle nodding ; calyx glandular, with branching, green nerves, cylindrical, in fruit glabrescent, club-shaped, teeth lanceolate, membranous-margined ; claws included ; limb whitish-green, bifid into linear lobes ; capsule ovate, *somewhat shorter than carpophore*, projecting beyond the calyx — May and June — Woody zone of Cassius and Amanus.

49. S. leucophylla, Boiss. ♃ .4 to .6, woolly-canescent, densely tufted at base, stems slender, viscid above. Radical leaves crowded, obovate-spathulate ; stem-leaves linear-spathulate and linear, very short. Flowers 3-5, terminal, long peduncled, nodding ; calyx .13 long, glandular, cylindrical, tapering below, in fruit club-shaped, teeth ovate, obtuse ; limb linear-cuneate, bifid into linear lobes ; capsule oblong, *long exserted from calyx, as long as carpophore* — May and June — Jebel Katarina, (Sinai).

§ 15. LASIOSTEMONES.

50. S. longipetala, Vent. ♃ .4 to .6, sparingly puberulent below, glabrous-viscid above. Lower leaves oblanceolate, acute, tapering into a petiole, floral lanceolate to linear-lanceolate. Branches of the somewhat one-sided broad panicle long, spreading, 3-7-flowered ; calyx .008 to .01 long, *in flower obconical, in fruit turbinate*, teeth ovate, obtuse ; claw ciliate ; limb white, bipartite into long, linear lobes ; capsule *somewhat exserted, ovate-spherical, four* times as long as carpophore — April and May — Common throughout to 1800 m.

Var. **purpurascens,** Boiss. Petals purple — Aleppo. Wilderness of Judea.

§ 16. SCLEROCALYCINÆ.

51. S. swertiæfolia, Boiss. ♃ .4 to .5, *glaucescent*, viscid above. Lower leaves obovate-spathulate, acute, petioled ; middle ovate-acute to lanceolate, upper often linear. Peduncles long ; calyx .03 long, cylindrical-obconical, in fruit club-shaped, teeth triangular, acuminate ; claws dilated, exserted ; limb greenish-yellow, bifid into

obovate lobes; capsule oblong, *once and a half* as long as carpophore — June — Woods ; Cassius, Amanus, and northward.

Var. **stenophylla,** Boiss. .2 to .4. Lower leaves oblanceolate, upper linear. Cymes few-1-flowered. Subalpine and alpine Lebanon and Antilebanon. Aintâb. (*S. Makmeliana, Boiss.*)

52. S. Schimperiana, Boiss. ♃ .5, glaucescent-viscid above, shrubby at base ; stems rigid, knotted, forked, long-branched. Lower leaves linear-spathulate, acute, upper linear. Flowers solitary, short-peduncled ; calyx .03 long, nearly nerveless, cylindrical-club-shaped, teeth triangular, acute ; limb linear-cuneate, bifid into linear-oblong lobes ; capsule oblong, *about as long as* carpophore — El Bustân (Sinai.)

53. S. Libanotica, Boiss. ♃ .2 to .6, glaucescent, somewhat viscid above ; trunk short, naked, woody ; stems slender, leafy ; branches often alternate, 1-flowered. Leaves oblong-spathulate obtuse, to lanceolate and linear acute. Peduncles as long as calyx ; calyx .015 long, nearly nerveless, obconical-cylindrical, in fruit club-shaped, teeth triangular, the alternate ones acuminate ; limb linear-cuneate, bifid ; crown 0 ; capsule oblong, *twice* as long as carpophore — August and September — Hebron. Alpine and subalpine Lebanon.

54. S. Porteri, Post. ♃ (Trans. Linnæan Society, London, 1888, p. 426) .1 to .3, tufted at base ; stems slender, 1-3-flowered. Leaves oblanceolate-spathulate to *linear and subulate*, the upper minute. Calyx .03 long, obconical-cylindrical, in fruit club-shaped, *with greenish-red nerves*, and triangular, scarious-margined, *ciliolate* teeth ; capsule oblong, *shorter* than .015 long carpophore — September — Alpine region of Ziaretdagh (Amanus).

§ 17. BRACHYPODÆ.

55. S. gigantea, L. ♃ .6 to 1.5, pubescent-viscid ; stem thick, quadrangular. Root-leaves densely rosetted, obovate-spathulate, mucronate, stem leaves oblong-lanceolate, the floral linear-lanceolate, all pubescent. Panicle long, *with dense, verticillate cymes*, the upper sessile ; calyx sparingly-hairy, .005 long, obconical, in fruit *oblong-turbinate*, teeth ovate, obtuse ; limb white, bipartite into oblong lobes; capsule .008 long, ovate, *at length rupturing the calyx, four to five times* as long as very short carpophore — June to September.

Var. **viridescens,** Boiss. Sparingly scabrous-pubescent. Panicle very viscid ; cymes more or less open — Rocky places ; middle zone of Lebanon, Amanus, and northward.

56. S. grisea, Boiss. ⊙ .2 to .4, *velvety, grey*, shrubby at base, tufted ; stems slender, angled, often geniculate below, viscid above, ending in a 1-7-flowered raceme-like panicle or raceme. Radical and lower leaves oblong-spathulate, the upper linear. Branches of raceme short, 1-3-flowered ; calyx glandular, cylindrical-obconical, in fruit *short*-club-shaped, *nodding*, teeth triangular, acutish ; limb yellowish-green, somewhat bipartite into linear lobes ; capsule oblong, somewhat exserted, *four times* as long as short carpophore — Summer — Rocky places ; alpine and subalpine Lebanon.

§ 18. SUCCULENTÆ.

57. S. succulenta, Forsk. ♃ .1 to .2, *velvety-papillose*, somewhat viscid, many-stemmed from a thick, vertical root ; stems diffuse, indurated at base, densely leafy. Leaves fleshy, oblong-spathulate, obtuse, floral lanceolate, usually as long as peduncles. Flowers *irregularly cymose*, or *forming a short, dense, leafy raceme ;* peduncles shorter than calyx ; calyx .02 long, cylindrical, in fruit club-shaped, teeth subulate from a lanceolate base, at length recurved ; claws exserted ; limb bifid to middle into oblong-spathulate lobes ; capsule oblong, somewhat longer than carpophore — April to June — Sands ; along coast.

§ 19. STENOPHYLLÆ.

58. S. Schlumbergeri, Boiss. ♃ .15 to .3, glabrous ; stems *filiform*, erect, rigid. Leaves *linear-setaceous*, acute, somewhat convolute ; bracts lanceolate, minute. Pedicels one-third as long as calyx ; calyx obconical, with *purplish, anastomosing nerves*, and triangular-lanceolate, white-margined, acute teeth ; limb white, bilobed to a third of its length ; capsule oblong, a little longer than carpophore — Antilebanon.

9. MELANDRIUM, Rœhl. Melandrium.

Calyx membranous, at length inflated, 5-toothed, 10-nerved, 5 of the nerves commissural. Petals 5, the limb furnished with coronal appendages. Stamens 10, of which 5 are adnate to the petals. Ovary 1-celled ; placenta many-ovuled. Styles opposite the calyx teeth. Capsule 1-celled, spliting down the valves, 10-toothed. Seeds kidney-shaped — Perennial herbs, with aspect of Silene, (ours) with diœcious flowers.

1. M. pratense, Rœhl. ♃ .3 to .5, pubescent. Leaves oblong to lanceolate-acuminate. Inflorescence glandular hairy ; the staminate calyx oblong, the pistillate ovate, teeth triangular-lanceolate, *one-third to one-half* as long as tube ; limb white, somewhat bifid, with obtuse lobes ; capsule sessile, ovate or oblong-conical, with erect teeth — Summer — Near Ehedin.

2. M. eriocalycinum, Boiss. ♃ .3 to .5, *crisp-velvety.* Leaves oblong, somewhat obtuse, the upper lanceolate. Calyx *woolly*, the staminate oblong the pistillate ovate, teeth triangular-lanceolate, *half* as long as tube ; limb white, bifid for one-third of its length ; capsule sessile, ovate, longer than calyx, *apex tapering,* teeth erect — Summer — Lebanon to highest peaks.

10. GITHAGO, Desf. Cockle.

Calyx coriaceous, with 5, at length deciduous lobes, and 10 riblike nerves, of which 5 are commissural. Petals 5, with naked limb. Stamens 10, of which 5 are adnate to petals. Ovary 1-celled, with central placenta, and many ovules. Styles alternate with calyx teeth. Capsule 5-toothed. Seeds large, kidney-shaped — Annual herbs, with erect forked stems, and long-peduncled, showy flowers.

1. G. segetum, Desf. ⊙ Corn Cockle .4 to .6, appressed-canescent. Leaves *linear-lanceolate.* Calyx-lobes linear-lnceolate, *much longer than tube,* and *purple,* obovate, somewhat retuse petals — April to July — Fields ; common.

2. G. gracilis, Boiss. ⊙ slender Cockle .3 to .5, appressed-canescent. Leaves *linear.* Calyx-lobes linear, *shorter than tube* and *pink,* obovate or obcordate petals — Fields ; Marash and northward.

ORDER XIV. **ALSINEÆ, DC.** (CHICKWEED FAMILY).

Herbs or shrubby plants, with opposite, stipulate or exstipulate leaves, regular flowers composed of 4-5 *distinct, persistent sepals,* 4-5 *(rarely* 0*) petals, generally imbricated in the bud, stamens inserted at the base of the sessile,* 1-*celled ovary, or into a hypogynous disk ; seeds with peripheral embryo* — Petals short clawed or sessile. Stamens 3-10 ; anthers 2-celled. Style 2-5, rarely 7. Capsule dehiscent by teeth or valves ; seeds many or few.

FIG. 71.



(*a*) Branch of an Arenaria with four pairs of opposite leaves, a 2-flowered cyme, two small bracts at the base of each pedicel, and one flower, and one capsule with three styles. (*b*) A flower magnified 3 diameters, showing the 5 petals, 10 stamens, and 3-valved capsule, surmounted by 3-styles. (*c*) A seed divided lengthwise to show the peripheral embryo.

TRIBE I. **SABULINEÆ.** Stipules 0. Valves of capsule undivided, as many as styles or fewer.

* *Styles as many as sepals, alternating with them.*

1. SAGINA. Stamens (in ours) 4. Petals minute or 0. Dwarf weeds, flowers minute, green.

** *Styles* 2-3 (*rarely* 4-7) *opposite the external sepals. Valves of capsule* 2-3, *alternate with sepals.*

2. BUFFONIA. Petals 4. Styles 2. Ovary 2-10-ovuled.

3. **ALSINE.** Petals 5. Styles 3. Ovary many-ovuled.

4. **QUERIA.** Petals 0, Styles 3. Ovary 1-ovuled.

TRIBE II. **STELLARINEÆ.** Stipules 0. Valves or teeth of capsule twice as many as styles.

* *Styles 2-3 (rarely 5) Capsule usually ovate or ovate-conical.*

5. **ARENARIA.** Petals 5, entire. Stamens 10, perigynous.

6. **STELLARIA.** Petals 4-5, bifid or bipartite. Stamens 10, hypogynous or perigynous.

7. **HOLOSTEUM.** Petals 5, denticulate. Stamens 3-4.

* * *Styles 5, (rarely 3-4). Capsule cylindrical, or conico-cylindrical.*

8. **CERASTIUM.** Petals 5 (rarely 4,) 2 toothed or bifid.

TRIBE III. **MALACHIEÆ.** Stipules 0. Valves of capsule and styles 5.

9. **MALACHIUM.** Petals 5, bipartite.

TRIBE IV. **SPERGULEÆ.** Leaves stipulate. Valves of capsule as many as styles.

10. **SPERGULA.** Styles 5. Leaves whorled.

11. **SPERGULARIA.** Styles 3, Leaves opposite.

1. SAGINA, L. Pearlwort.

Sepals 4-5. Petals 4-5, entire or retuse, often 0. Stamens 4-10, hypogynous. Ovary many-ovuled. Capsule 4-5-valved to base. Seeds kidney-shaped. Tufted annual or perennial herbs, with white or green flowers, and awl-shaped leaves, connate at base, forming a sheath.

1. S. procumbens, L. ♃ .02 to .1, stems *procumbent*, rooting at base. Leaves *glabrous.* Sepals ovate, obtuse, *equal;* petals ovate, half as long as calyx, sometimes 0 — September — Subalpine Lebanon, Amanus, and northward.

2. S. apetala, S. ⊙ .02 to .05, stems *erect*, branching from base. Leaves *ciliate at base*, rarely glabrous. Sepals ovate, obtuse, *unequal*, shorter than capsule ; petals minute, lanceolate, or 0 — Spring — Sandy places ; along coast.

2. BUFFONIA, Sauv. Buffonia.

Sepals 4, scarious-margined. Petals 4, entire or bidentate. Stamens 4-8, inserted on a perigynous, sometimes glandular disk. Styles 2. Ovary 2-10-ovuled. Capsule lenticular, compressed at base, 2-valved. Seeds generally 2, basilar — Annual or perennial herbs with aspect of Juncus bufonii.

* *Annuals.*

1. B. macrosperma, J. Gay. ⊙ .2 to .4 ; stems simple or forked. Pedicels scabrous ; sepals lanceolate, acuminate, 3-7-nerved; petals one-half to three-fourths as long as sepals ; stamens 4, as long as petals ; styles shorter than ovary ; seeds tubercled at face and back — May and June — Stony places ; Lebanon, Cœlesyria, and Antilebanon.

Var. **virgata,** Post. Stems nearly simple. Seeds less strongly tuberculed on face than at back — Same range as last. (*B. virgata, Boiss.*)

* * *Perennials.*

2. B. multiceps, Decaisn. ♄ .2, shrubby at base ; branches erect, nearly simple, *velvety.* Pedicels short, velvety ; sepals glabrous, lanceolate, acute, 3-nerved ; petals entire, lanceolate, somewhat shorter than calyx ; filaments *half as long as calyx ;* styles somewhat longer than ovary ; seeds slightly tubercled at back, flattish at face — June — Rocky places ; Sinai.

3. B. calyculata, Boiss. et Bal. ♄ .2 to .3 ; stems prostrate, branches erect, slender, *glabrous,* simple. Flowers *nearly sessile, bracted at base ;* sepals lanceolate, the *outer obsoletely* the inner manifestly nerved ; petals entire, a little shorter than calyx ; stamens *a little longer than petals ;* styles much longer than ovary ; seeds slightly tubercled at back, .002 long — Summer — Akherdagh, and northward.

4. B. Kotschyana, Boiss. ♄ .2 to .3, glabrous, woody at base ; branches stiff, forked above. Flowers nearly solitary ; sepals about equal, lanceolate, *all manifestly* 5-7-nerved ; petals lanceolate as long as sepals and stamens ; styles as long as ovary ; inner face of seed smooth, margin minutely tubercled — Summer — Qamu'-el-Hurmul (Cœlesyria.)

3. ALSINE, Wahl. Grove Sandwort.

Sepals 5, entire or retuse, rarely 0. Stamens 10 or fewer, inserted with glands on a somewhat perigynous disk. Styles 3. Ovary generally many-ovuled. Capsule 3-valved. Seeds kidney-shaped, somewhat laterally compressed, not arillate — Annual or perennial herbs or shrubs, with small white or pinkish flowers.

* *Perennials.*

† *Sepals velvety, nerves* 0.

1. A. procumbens, Wahl. ♃ .15 to .25, glandular-pubescent, rootstock woody ; branches prostrate. Cymes *irregularly forked ;* pedicels longer than calyx, at length declined ; leaves fleshy, oblong to linear-oblanceolate, .003 to .005 long ; sepals narrowly white-margined, ovate; pink petals and ovate capsule as long as calyx — Spring — Desert south of Gaza, and southward to Egypt.

† † *Sepals more or less* 1-3 *or* 5-7-*nerved.*

2. A. rupestris, Labill. ♃ .03 to .1, densely tufted ; trunk short, woody, naked. *Leaves of sterile branches dense,* .01 long, stiff, awl-shaped, obtuse, ciliate at base, with thick midrib, of flowering branches *few,* .002 to .005 long. Cymes 3-5-flowered ; pedicels glandular, *once and a half to thrice* as long as calyx; sepals oblong-linear, rather obscurely 3-nerved ; petals pink, oblong-linear, once and a half as long as calyx ; capsule as long as calyx, few-seeded — September— Alpine summits of Lebanon and Hermon.

3. A. recurva, All. Ped. ♃ .1 to .15, tufted ; stems woody below ; branches slender, corymbose above. Leaves subulate, .01 long, 3-nerved, those of sterile branches clustered. Pedicles *once to*

twice as long as calyx ; sepals lanceolate, 5-7-nerved ; petals as long as calyx or longer ; capsule shorter than calyx — Summer.

Var. **nivalis,** Boiss. Leaves usually glabrous. Calyx .004 long — Ziaretdagh (Amanus), and northward.

4. A. juniperina, Fenzl. ♃ .15 to .2, tufted ; trunks prostrate, woody, tumid at nodes ; branches stiff, simple. Leaves .015 to .025 long, awl-shaped, mucronate, obtusely keeled, somewhat 1-nerved, generally recurved, *the dead ones persistent. Cymes umbellike ;* sepals lanceolate, acute, strongly 3-nerved ; petals linear-cuneate, once and a half as long as calyx ; capsule conico-cylindrical, once and a half as long as calyx — June to September — Higher regions of mountains of Galilee, Lebanon, Hermon, Amanus, and northward.

Var. **legitima,** Boiss. Leaves prickly.

Var. **tenuifolia,** Boiss. Leaves less rigid.

5. A. setacea, Thuill. ♃ .05 to .1, glaucescent, many-stemmed from a woody base ; stems filiform. Leaves mostly on the sterile stems, .005 to .01 long, *setaceous*, obtuse or mucronate. Inflorescence more or less densely *corymbose ;* sepals oblong-lanceolate, the midrib with a *narrow* green stripe on each side ; petals about as long as calyx ; capsule somewhat longer than calyx — Late summer — Alpine regions of Ziaretdagh (Amanus).

6. A. Libanotica, Boiss. ♃ .03 to .1, glabrous, tufted ; stems elongated, prostrate, filiform ; branches short, corymbose, 2-5-flowered. Leaves terete-subulate, grooved, obtuse, the lowermost densely imbricated in four rows. Pedicels shorter than calyx ; sepals lanceolate, acute, with a green band on each side of the midrib, *as broad as the scarious margin ;* petals somewhat shorter than calyx ; capsule as long as calyx — Summer — Sandy places ; alpine summits of Makmel. Too near the last species.

Var. **papillosa,** Post. Papillose-glandular.

** *Annuals.*

† *Sepals* 5-3-*nerved.*

7. A. Meyeri, Boiss. ⊙ .06 to .08, sparingly glandular-hairy ; stems forked, cymose ; branches filiform. Leaves linear, 7-nerved. Pedicels straight, shorter than calyx ; sepals herbaceous, hirtulous, unequal, lanceolate-acuminate, the outer 5- the inner 3-nerved ; petals one-third as long as calyx ; capsule oblong, two-thirds as long as calyx — Spring — Sandy places near Ehedin (Lebanon). Ssoffdagh.

Var. **major,** Boiss. Lower leaves .02 long. Pedicels longer than .008 long calyx — Sinai.

8. A. brevis, Boiss. ⊙ .01 to .03, glandular-puberulent. Leaves awl-shaped, 5-nerved at broad base. Cyme dense, *few-flowered, terminal,* sometimes with a few 1-2-flowered clusters in axils ; sepals 3-nerved, lanceolate, acuminate ; petals one-third, capsule two-thirds as long as calyx — Spring — Rocks ; Sinai. Summit of Jebel Barûk (Lebanon.)

9. A. Smithii, Fenzl. ⊙ .1 to .15, glandular-villous ; stems thickish, stiff, irregularly forked. Leaves linear-lanceolate, 5-7-nerved. Cymes loosely clustered, axillary, few-flowered ; pedicels half as long as .007 long calyx, at length spreading or nodding ; sepals unequal, 3-nerved, lanceolate, acute ; petals ovate or oblong, one-third to one-fourth as long as calyx ; capsule shorter than calyx — May and June — Fields ; Haurân to Palmyra, Hamath, Lebanon, Antilebanon, and northward.

10. A. decipiens, Fenzl. ⊙ .1 to .15, pruinose, viscid, diffusely forked. Leaves linear, 5-7-nerved. Cymes clustered, *forked, axillary and terminal ;* flowers nearly sessile ; calyx conical, truncate at base, strongly gibbous ; petals nearly equal, lanceolate, acute, half as long as the .004 long calyx ; capsule shorter than calyx — April to September — Dry places ; Moab and Carmel to Palmyra, Amanus, Aintâb, and northward.

11. A. intermedia, Boiss. ⊙ Stems simple, crisp-hairy. Leaves linear-lanceolate, ciliate, somewhat 5-nerved at base. Cymes *nearly sessile, axillary, minute, forming a short, clustered raceme ;* floral leaves longer than flowers ; calyx truncate, gibbous at base, with unequal, 3-nerved, lanceolate-acuminate sepals ; petals *minute,* oblong ; capsule two-thirds as long as calyx — Spring — Jebel Nahhâs, near Aleppo.

12. A. tenuifolia, L. ⊙ .05 to .2, glabrous or glandular-hairy, dichotomously panicled. Leaves *awl-shaped.* Sepals lanceolate, acute, 3-nerved ; petals ovate-oblong, tapering at base ; stamens 3-10 ; capsule conico-cylindrical, rarely ovate, often longer than calyx — Spring — Common throughout. Varies greatly in aspect.

Var. **macropetala,** Boiss. Like type, but calyx somewhat hairy ; petals as long as sepals or longer ; anthers often violet-colored ; capsule as long as calyx.

Var. **mucronata,** Boiss. Cymes contracted ; flowers crowded ; pedicels short ; sepals hairy, acuminate, sometimes with oblique tip ; stamens generally 5 ; petals much shorter than calyx or 0.

Var. **viscosa,** Boiss. Stiff, more or less glandular ; flowers smaller ; stamens generally 5 ; capsule nearly as long as calyx.

13. A. thymifolia, Sibth. et Sm. ⊙ .04 to .05, glabrescent ; stems simple, densely forked, corymbose-cymose. Leaves short, *fleshy, linear-spathulate,* obtuse, 3-nerved at base. Calyx once and a half to twice as long as pedicels, *obovate-oblong,* acute, 3-nerved, glabrous, with a narrow, white margin ; petals ovate, somewhat longer than calyx ; stamens 10 ; capsule ovate, somewhat longer than calyx — Spring.

Var. **Syriaca,** Boiss. Inflorescence hairy — Ras Beirût.

† † *Sepals keeled,* 1-*nerved. Leaves setaceous.*

14. A. picta, Sibth. et Sm. ⊙ .05 to .15, glandular ; *densely leafy at base ;* stems *filiform,* erect, dichotomous. Cymes long-peduncled, diffuse, scarious-bracted ; pedicels twice to thrice as long as calyx, at length reflexed ; sepals glabrous, *ovate, obtuse,* scarious-margined ; petals pink, striate, obovate, retuse, twice and a half as long as

calyx ; capsule ovate, somewhat longer than calyx — April and May— Fields ; Aleppo to Judea and Moab.

Var. **Sinaica,** Boiss. *Quleiqalah.* Leaves long-mucronate. Flowers smaller. Margin of sepals narrower. Petals once and a half as long as calyx — Sinai.

15. A. formosa, Fenzl. ⊙ .05 to .15, glandular ; stem erect, dichotomous, leafy. Cymes long-peduncled, dichotomous, diffuse ; pedicels much longer than calyx, capillary, spreading, straight ; bracts half scarious ; sepals *ovate-lanceolate, cuspidate,* scarious-margined ; petals pink, obovate-cuneate, once and a half as long as calyx — Spring — 'Akkâr. Nusairy Mountains.

4. QUERIA, L. Queria.

Sepals 4. Petals **0**. Staminoids 5, linear, short. opposite the sepals, rarely 0. Stamens **10**. Styles 3. Ovary 1-ovuled. Capsule 3-valved to middle. Seeds reniform-globular, somewhat flattened laterally, not arillate — Dwarf annuals, with densely capitate flowers.

Q. Hispanica, Lœfl. ⊙ .05 to .15, crisp-puberulent. Cymes capitate, bracteate, short-peduncled, corymbose ; flowers sessile, the one at the fork fertile, the lateral sterile, reduced to two bract-like sepals ; fertile flowers with unequal, 3-nerved sepals, the outer pair and the bracts hooked at apex — Spring and Summer — Lebanon and Antilebanon to Aleppo, Aintâb and northward.

5. ARENARIA, L. Sandwort.

Sepals 5. Petals 5, entire or retuse. Stamens 10, inserted on a perigynous, glandular disk. Styles 3 (rarely 2-5). Ovary many-ovuled. Capsule with 6 entire or 3 two-toothed valves. Seeds not arillate, kidney-shaped, or laterally compressed — Annual or perennial herbs, sometimes shrubby at base.

* *Perennials.*

1. A. drypidea, Boiss. ♄ .2, glabrous, glaucescent ; *sterile leafy branches* 0. Leaves .015 long, linear, *flat*, acute, *not prickly*, scabrous-margined. Panicle terminal, thyrsoid ; bracts triangular, subulate ; pedicels several times as long as calyx ; sepals *hooded*, ovate, green turning blackish, scarious-margined ; petals twice as long as calyx — August — Akherdagh.

2. A. Ledebouriana, Fenzl. ♄ .2, glabrous, woody below ; stems corymbose above. Leaves of short, *sterile branches crowded*, of fertile remote, all awl-shaped, *triquetrous, mucronate-prickly.* Pedicels glabrous, *longer* than calyx ; sepals ovate-oblong, acute, with yellowish margin and green back, keeled, mucronate ; petals twice as long as calyx — Summer — Mountains of northern border of Syria.

3. A. acerosa, Boiss. ♃ .1 to .15, shrubby at base ; stems prostrate ; branches ascending. Leaves of short, sterile branches *crowded, pennicilliform,* of fertile remote, all .005 to .01 long, rigid, *triquetrous,* slender, awl-shaped, mucronate. Cymes 5-9-flowered ; pedicels *glutinous,* shorter than ovate, keeled, acuminate, *prickly-point-*

ed, glutinous sepals ; petals one-third longer than calyx — Summer— Akherdagh, and northward.

4. A. Libanotica, Ky. ♃ .02, tufted, glandular-velvety. Leaves .001 long, glabrescent, *imbricated at base of branches,* obovate, keeled, obtuse. Stems 1-3-flowered ; pedicels longer than calyx ; sepals glandular-hairy, ovate, obtuse ; petals obovate, once and a half as long as calyx — Summer — Rocky places ; alpine Lebanon.

5. A. graveolens, Schreb. ♃ .1 to .3, pubescent-viscid, tufted ; branches brittle, filiform, ascending, loosely forked, cymose. Leaves short-petioled, ovate or oblong, acute, tubercular-punctate. Pedicels capillary, several times as long as calyx ; sepals hairy, green, oblong-lanceolate, acuminate ; petals oblong-linear, entire or retuse, a little longer than calyx — Summer and autumn — Middle and subalpine Lebanon and Antilebanon. Sinai.

Var. **minuta,** Post. Flowers .002 long. Woods ; 'Ajlûn.

* * *Annuals.*

† *Leaves several-nerved.*

6. A. leptoclados, R'ch'b. ⊙ .1 to .2, puberulent-scabrous, rigid, stiff-branched, dichotomously panicled-racemed. Leaves ovate, acute, subsessile. *Fruiting pedicels spreading horizontally ;* sepals hairy, lanceolate, acute, 3-nerved, thrice as long as ovate petals ; capsule *oblong,* somewhat longer than calyx — May — Sandy places ; coast and interior plains and lower mountains.

7. A. serpyllifolia, L. ⊙ .1 to .2, puberulent-scabrous, dichotomously panicled. Leaves ovate, acute, subsessile. *Fruiting pedicels erect ;* sepals hairy, ovate-lanceolate, acute, 3-nerved, twice to thrice as long as ovate petals ; capsule *inflated, ovate,* longer than calyx — May — Near Cedars of Lebanon.

8. A. Cassia, Boiss. ⊙ .05 to .1, pubescent-scabrous ; stems decumbent, dichotomously panicled. Leaves subsessile, ovate-spathulate, obtuse, mucronulate, minutely tubercled. Pedicels erect, twice as long as calyx ; sepals hairy, round-ovate, the outer 5-, the inner 3-nerved ; petals oblong, two-thirds as long as calyx ; capsule ovate, *inflated,* abruptly tapering into an exserted neck — May — Subalpine Lebanon. Middle zone of Cassius.

Farther study will probably reduce the foregoing three species to one.

9. A. tremula, Boiss. ⊙ .15 to .25, pruinose-scabrous below ; stems 1-2-forked, diffuse. Leaves subsessile, oblong, acute. Pedicels capillary, rigid, much longer than calyx, at length spreading ; sepals *glabrous,* ovate-oblong, acuminate, 3-nerved, white-margined ; petals oblong, two-thirds as long as calyx ; capsule ovate-conical, somewhat longer than calyx — June — Woods ; Cassius.

* * *Leaves 1-nerved.*

10. A. oxypetala, Sibth. et Sm. ⊙ .05 to .1 puberulent-glandular ; stems filiform, sparingly leafy, dichotomous-cymose above.

Leaves small, ovate, tapering into a petiole. Pedicels several times as long as calyx, spreading or deflexed in fruit ; sepals papillose, lanceolate, acute, obsoletely several-nerved ; petals lanceolate-linear, scarcely longer than calyx ; capsule oblong, a little longer than calyx — Spring — Rocky places ; Mureijât (Lebanon.)

11. A. Pamphylica, Boiss. ⊙ .1 to .15, sparingly hirtulous, tender ; stem erect, stiff, dichotomously branched, loosely corymbose above. Lower leaves ovate or deltoid, obtuse, short-petioled, upper linear-elliptical, acute. Pedicels setaceous, erect, several times as long as calyx ; sepals hairy, lanceolate, acuminate, obsoletely 5-nerved ; petals obovate, obtuse, tapering at base, one-third longer than calyx ; capsule oblong, a third longer than calyx — May — Lebanon, near the Cedars.

6. STELLARIA, L. Chickweed. Starwort.

Sepals 5. Petals 5, bifid or bipartite. Stamens 10 (rarely fewer), hypogynous, or implanted on an elongated, perigynous disk. Styles 3 (rarely 2). Ovary many- or few-ovuled. Capsule 6- (rarely 4-) valved to the middle or beyond. Seeds not arillate, kidney-shaped, somewhat laterally compressed — Tender, diffusely branched annuals, with white flowers.

1. S. Cilicica, Boiss. ⊙ .2 to .3, *sparingly scabrous ;* stems dichotomously branched, cymose-paniculate, leafy. Leaves *linear-lanceolate.* Sepals oblong, acuminate, membranous-margined ; styles 3 ; seeds 2-5 — May and June — Middle zone of Lebanon.

2. S. media, L. .2 to .4 ; stems diffuse or ascending, *with a single hairy line*, cymose above. Leaves *ovate*, the lower petioled, the upper sessile. Sepals hairy, oblong, obtuse ; stamens generally 5 ; styles 3 ; seeds numerous — Spring — Fields and moist places ; everywhere.

Var. **pubescens,** Post. Crisp-pubescent all around the stems — Beirût.

Var. **major,** Post. All the parts of the plant larger, in aspect resembling Malachium aquaticum.

7. HOLOSTEUM, L. Jagged Chickweed.

Sepals 5. Petals 5, entire or dentate. Stamens 10, or 3-4. Styles 3. Capsule cylindrical, with 6, revolute teeth. Seeds not arillate, tubercled in rows, flattened at back, shield-shaped, with concave, longitudinally keeled face — Low annuals, with umbellate flowers, unequal, 1-flowered pedicels, refracted in fruit, but often erect after the shedding of the seed.

1. H. umbellatum, L. ⊙ .1 to .2, *glaucous*, glabrous, or sparingly glandular. Leaves oblong, the lower tapering into a petiole. Petals bearded at base, *sinuate-dentate at apex ;* stamens often 3-4, filaments shorter than calyx — April — Fields and sandy places ; common.

Var. **ovatum,** Post. Leaves ovate to ovate-oblong — Aintâb.

2. H. liniflorum, Stev. ⊙ .1 to .15, *green*, glandular-hairy. Leaves oblong to oblong-linear, the radical tapering into a petiole. Sepals ovate-oblong ; petals *glabrous at base, entire ;* stamens 10, filaments as long as calyx — Spring — Sandy places and fields ; Aleppo ; Damascus ; Sinai.

8. CERASTIUM, L. Mouse-ear Chickweed.

Sepals 5 (rarely 4). Petals 5 (rarely 4), bidentate or bifid. Stamens 10-8 (rarely 5-4). Styles 5 (rarely 3-4). Teeth of cylindrical capsule double the number of the styles. Seeds globular or reniform, not arillate — Perennial or (ours) annual herbs, with white flowers.

* *Styles* 3 (*rarely* 4-5).

1. C. anomalum, W. K. ⊙ .1 to .2, glandular-pubescent, erect, cyme several times forked, corymbose. Leaves linear, the lowest somewhat spathulate. Pedicels ascending, once to thrice as long as calyx ; sepals oblong-lanceolate, with *narrow, scarious-margins ;* petals longer than calyx, *bifid to middle* — April — Fields ; Aleppo to Hamath, Tripoli, Antilebanon, and Haurân.

2. C. Kotschyi, Boiss. ⊙ Glandular-hairy above ; stem erect ; cyme several times forked, corymbose. Leaves linear, those of stem somewhat dilated at base. Pedicels erect, somewhat longer than calyx ; sepals oblong, rather obtuse, with *broad, scarious margins ;* petals as long as calyx, with two *short* teeth — Spring — Bludân (Antilebanon). Probably a variety of the last.

* * *Styles* 5.

† *Teeth of capsule convolute at apex. Margin not revolute.*

3. C. perfoliatum, L. ⊙ .3, glabrous, glaucous ; cyme many-flowered, stiff. Lowest leaves petioled, lanceolate, the others oblong to ovate, more or less connate. Pedicels several times as long as calyx, erect ; sepals oblong, acute, tubercled-punctate ; petals bilobed, shorter than calyx ; capsule .02 long, twice to thrice as long as calyx ; seeds *echinate* — Spring — Fields ; Aleppo to Aintâb, Marash, and northward.

† † *Teeth of capsule spreading or straight. Margin flat or revolute.*

‡ *Capsule indehiscent, opening by a terminal pore. Teeth obsolescent.*

4. C. Illyricum, Arduin. ⊙ .03 to .1, densely hirsute, *hairs retrorse along branches, spreading at leaves and calyx.* Leaves oblong-spathulate and oblong, obtuse. *Cyme loose ;* pedicels erect or spreading, once to twice as long as calyx ; sepals *villous*, lanceolate, acute ; petals oblong-linear, bifid for one-third their length, *shorter than calyx;* capsule .005 long, *somewhat shorter than calyx* — May and June — Sandy and rocky places ; Lebanon from 1300 m. upward.

‡ ‡ *Teeth of capsule long ; margin not revolute.*

5. C. dichotomum, L. ⊙ .1 to .2, glandular-pubescent. Leaves lanceolate-linear, rather obtuse. Cyme *dense*, corymbose ; pedicels erect, shorter than calyx ; *calyx not inflated ;* sepals oblong, acute ;

petals glabrous, obovate-oblong, bilobed, shorter than calyx ; capsule .02 long, *twice to thrice as long as calyx* — April and May — Fields ; Hûleh to Haurân, Antilebanon, Lebanon and northward.

6. C. inflatum, Link. ⊙ .1 to .2, glandular-pubescent. Leaves lanceolate, rather obtuse. Cyme *loosely dichotomous ;* pedicels erect, shorter than calyx ; *calyx inflated*, *ovate-globular*, umbilicate at base ; sepals ovate-oblong, acuminate ; petals glabrous, obovate-oblong, bilobed, shorter than calyx ; capsule .02 long, *much narrower than calyx*, and once and a half to twice as long — April to June — Sinai, Lebanon, and Antilebanon, to Marash, and northward.

‡ ‡ ‡ *Teeth of capsule with revolute margins.*

§ *Base of petals bearded.*

7. C. viscosum, L. ⊙ .1 to .3, *glandular-pubescent.* Lower leaves obovate-spathulate, tapering into a petiole, the others *oblong* or *elliptical*, .015 long, .01 broad. Cyme dense ; pedicels nearly as long as calyx, at length spreading or recurved ; sepals oblong, acuminate, bearded at tip ; petals about as long as calyx, bifid for one-third of their length ; capsule .01 long, somewhat incurved, *twice* as long as calyx — January to April — Plains and lower mountains ; common.

8. C. brachypetalum, Desp. ⊙ .1 to .2, *hirsute with long hairs.* Lower leaves spathulate, upper ovate-oblong. *Cyme loose ;* pedicels nodding, twice to thrice as long as calyx ; sepals lanceolate ; petals obovate, bilobed, shorter than calyx ; capsule .006 long, somewhat incurved, a third longer than calyx — May — Borders of rivulets ; Ehedin.

§ § *Base of petals glabrous.*

9. C. glutinosum, Fries. ⊙ .1 to .3 or more, *glutinous.* Leaves oblong or elliptical, the lower tapering into a petiole. *Cyme dense ;* pedicels once to twice as long as calyx, recurved ; petals a little longer than calyx, bidentate ; capsule .008 long, once and a half to twice as long as calyx — Spring and Summer — Sandy places ; middle zone of Lebanon, Cœlesyria, Nusairy Mountains, and northward.

10. C. fragillimum, Boiss. ⊙ .1 to .3, hirsute, very viscid ; stems ascending. slender, *brittle.* Lower leaves spathulate, the others oblong. *Cyme very loose ;* peduncles twice to thrice as long as calyx, *in fruit refracted, at length* erect ; sepals oblong, obtuse, narrowly scarious ; petals somewhat shorter than calyx, linear-oblong from a tapering base, with two, short, acute teeth ; capsule .006 long, incurved, nearly twice as long as calyx — June and July — Subalpine and alpine Lebanon and Antilebanon.

9. MALACHIUM, Fries. MALACHIUM.

Sepals 5. Petals 5, nearly hypogynous, 2-parted beyond middle. Stamens 10. Seeds globular, tubercled — A perennial herb, with aspect of Stellaria media, L., var. pubescens and major.

M. aquaticum, L. ♃ .2 to .4, crisp-pubescent or glabrescent ; stems flaccid, decumbent or climbing. Leaves oblong to cor-

date-ovate, acuminate. Cyme loose ; pedicels long, reflexed in fruit ; sepals ovate, obtuse, growing in fruit ; petals and capsule longer than calyx — Spring — Moist places ; central Palestine.

10. SPERGULA, L. SPURREY.

Sepals 5, fleshy, herbaceous, with membranous margins. Petals 5, inserted at bottom of calyx. Stamens 5-10, inserted on a perigynous ring. Styles 5, alternating with sepals. Capsule parted into 5 valves, opposite the sepals ; placenta central, columnar ; seeds lenticular, margined or winged, with fungous, thickened funicle — Annual herbs with slender, filiform, clustered, somewhat whorled leaves.

1. S. arvensis, L. ⊙ .1 to .3, green. Leaves grooved beneath. Petals ovate, obtuse ; seeds *globular-lenticular*, *minutely tubercled or white-papillose*, with *narrow* margins — April and May — Sandy places ; not rare.

2. S. pentandra, L. ⊙ .1 to .15, glaucescent. Leaves not grooved beneath. Petals lanceolate, acute ; *seeds flattened*, with a white wing, *as broad as disk*, *radiate-striate* — Spring — Near Gaza.

11. SPERGULARIA, Pers. SPURREY SANDWORT.

Sepals 5, scarious-margined. Petals 5, entire, inserted at bottom of calyx. Stamens 5-10, rarely 2-3, inserted on a perigynous ring. Styles 3, rarely 5. Capsules 3- (rarely 5-) parted ; placenta central, columnar, seeds pear-shaped, or flattened-lenticular, scarious-margined or wingless — Annual or perennial herbs, with opposite, filiform, fleshy leaves, and reflexed fruiting pedicels.

1. S. rubra, L. Wahl. ⊙ or ♃ .1 to .2, more or less glandular ; stems ascending. Cymes *leafy ;* sepals *lanceolate*, scarious-margined ; petals reddish, obovate, *as long as calyx ;* stamens 5-10 ; capsule nearly as long as calyx ; seeds triangular-obovate, wingless, wrinkled, thick-margined — Spring — Roadsides ; common, especially along coast.

2. S. diandra, Guss. ⊙ .1 to .15, glandular, or glabrescent below ; stems erect or ascending. Cymes *leafless ;* sepals *oblong*, scarious-margined ; petals red, ovate, *somewhat shorter than calyx ;* stamens 2-3 ; capsule somewhat longer than calyx ; seeds triangular-obovate, wingless, roughish, thick-margined — Spring — Sandy places ; common, especially in interior.

3. S. media, Wahl. ⊙ or ♃ .15 to .25, pubescent-glandular ; stems prostrate or ascending. Cyme leafy ; sepals lanceolate, scarious-margined, usually with a gland at each side of base ; petals obovate, longer than calyx ; stamens 5-10 ; capsule a little longer than calyx ; seeds *smooth*, wingless — Spring — Moist places along coast.

4. S. marginata, DC. ♃ .1 to .25, glabrescent below, pubescent-glandular above ; stems prostrate or ascending. Cymes racemose, nearly leafless ; sepals lanceolate, with *broad*, scarious margins, and

usually glandless at base ; petals as long as calyx ; stamens 5-10 ; capsule *once and a half to twice* as long as calyx; seeds rather smooth with *broad wings* — Spring — Salt marshes ; coast and interior.

ORDER XV. PARONYCHIEÆ. (WHITLOW-WORT FAMILY).

Differs from Alsineæ chiefly in the more or less united calyx, in the generally smaller, often staminoid, petals (frequently 0). Stamens as many as calyx lobes or fewer, rarely twice as many. Styles 2-3, separate or connected at base. Fruit a 1-celled, many-seeded, 3-valved capsule, or a 1-seeded, indehiscent utricle.

* *Embryo peripheral, i.e., around the albumen.*

TRIBE I. **POLYCARPEÆ.** Ovary ∞-ovuled. Capsule free, ∞-seeded, dehiscent by valves. Leaves stipulate.

1. ROBBAIREA. Petals clawed, with ovate or cordate limb.
2. POLYCARPON. Petals obcordate or oblong.
3. POLYCARPÆA. Petals lanceolate, half as long as calyx.

TRIBE II. **ILLECEBREÆ.** Ovary 1-ovuled. Utricle membranous, 1-seeded. Leaves stipulate.

4. HERNIARIA. Tufted, prostrate, grey or green herbs.
5. PARONYCHA. Prostrate herbs with silvery, scarious bracts.
6. GYMNOCARPUM. Branched, salsola-like bush, with cymose, reddish flowers.
7. SCLEROCEPHALUS. Dwarf, desert herbs, with spiny fruiting heads, Petals 0.

TRIBE III. **CORRIGIOLEÆ.** Ovary 1-ovuled. Fruit minute, nut-like.

8. CORRIGIOLA. Herbs with filiform branches, and fleshy, stipulate leaves.

TRIBE IV. **SCLERANTHEÆ.** Ovary 1-2-ovuled. Utricle membranous, 1-seeded, included in calyx. Leaves opposite, exstipulate.

9. SCLERANTHUS. Calyx-tube urn-shaped. Petals filiform or abortive
10. HABROSIA. Calyx lobes slightly united, aristate. Petals obovate-spathulate.

* * *Embryo straight, lateral.*

TRIBE V. **PTERANTHEÆ.** Ovary 1-ovuled. Utricle 1-seeded, membranous, included in calyx. Leaves opposite, with minute stipules. Cymes 3-branched, the central bearing one, fertile flower, the lateral sterile, with pinnate or plumose branches.

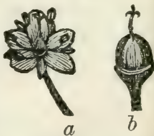
11. PTERANTHUS. Sepals and stamens 4. Petals 0. Sterile branches of cyme pinnate.
12. COMETES. Sepals, petals and stamens 5. Sterile branches of cyme plumose.

1. ROBBAIREA, Boiss. ROBBAIREA. *Ghabashî.*

Calyx lobes 5, plano-concave, with narrow, scarious margin. Petals 5, short-clawed, limb cordate-ovate. Stamens 5, connate below in a ring around the ovary. Style trifid at apex. Capsule 3-valved. Seeds wedge-shaped, incurved, with grooved back — Herbs resembling Polycarpon.

R. prostrata, Forsk. ♃ *Ghubeirah. Simsum. Hharahh. Hharhhâr. Hhâr. Quleqaleh.* .2 to .3, glabrous; stems numerous, filiform, prostrate, stiff-branched. Leaves oblong to linear ; stipules and bracts triangular, with scarious margins. Cymes loose, clustered, pedicels as long as calyx or longer ; sepals ovate, obtuse ; petals pink, as long as calyx — Spring — Hebron to Arabia Petraea.

FIG. 72.



(*a*) Flower of R. prostrata. (*b*) Capsule with style trifid at apex

2. POLYCARPON, L. Polycarpon.

Calyx parted into 5, keeled, scarious-margined lobes, hooded at apex. Petals 5, obovate to oblong. Stamens 3-5, inserted on a perigynous disk. Style trifid at apex. Capsule 3-valved. Seeds with curved back and straight face — Herbs with scarious-silvery stipules and bracts.

* *Stipules and bracts all scarious ; bracts embracing base of calyx.*

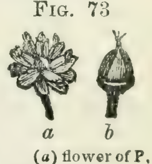
1. P. tetraphyllum, L. ⊙ .1 to .2, stems many times 2-3-forked, from a diffuse base. Leaves oblong-spathulate to elliptical, *those of stem 4-ranked*, of branches opposite. Cymes rather loose ; pedicels longer than calyx ; sepals ovate, mucronate ; petals *notched*, half as long as calyx ; Stamens 3 ; *style shorter than ovary* — Spring and Summer — Roadsides everywhere.

2. P. Arabicum, Boiss. ⊙ .02 to .04 ; stems prostrate. Leaves small, fleshy, *opposite, linear-oblong.* Cymes *dense ;* pedicels as long as calyx ; sepals oblong, obtuse, with broad, scarious margin ; petals oblong-linear, as long as calyx ; stamens 5 ; style twice as long as ovary — March — Sandy places ; Et-Tîh and Sinai.

* * *Stipules and bracts with green nerve ; bracts shorter than pedicels.*

3. P. succulentum, Del. .02 to .1, stems prostrate. Leaves fleshy, in fours or opposite, *oblong-spathulate to linear-oblong, tapering into a petiole.* Cyme *loose*, few-flowered ; pedicels often longer than calyx ; sepals oblong, obtuse, the interior longer ; petals oblong-obovate, as long as calyx ; style longer than ovary — Spring — Sands ; Beirût ; southern Palestine, and southward to Egypt and Sinai.

Fig. 73



(*a*) flower of P. succulentum.
(*b*) Capsule, showing the 3-fid styles.

3. POLYCARPÆA, Lam. Polycarpæa.

Calyx parted into 5, somewhat flattened, acute, scarious-margined lobes. Petals 5, lanceolate, half as long as calyx. Stamens 5, sometimes with 5 staminoids opposite the petals, all inserted in a perigynous disk ; style capitate at apex or tripartite. Capsule 3-valved ; seeds pear-shaped, somewhat incurved — Herbs or shrubs, resembling Polycarpon.

P. fragilis, Del. ♃ *Qumeilah. Makkûr.* .1 to .2, appressed-crisp-tomentellous ; stems herbaceous, prostrate, branching, *brittle.* Leaves somewhat rigid, opposite or clustered, *minute, lanceolate, acutish, with revolute margins.* Cymes dense, terminal, panicled ; calyx-lobes ovate, with broad, scarious margin, and prominent green nerve, mucronate ; *style as long as ovary ;* stigma capitate ; seeds 8-10 — Spring — Sinai, and northward and eastward.

Fig. 74.



Flower of P. fragilis.

4. HERNIARIA, L. Herniaria.

Calyx-lobes 4-5; plano-concave. Petals filiform. Stamens 4-5, inserted at the throat of the calyx. Styles 2, free or united, bifid at

apex. Utricle indehiscent, included in calyx. Seed vertical. with inferior radicle — Prostrate, tufted herbs, sometimes shrubby at base, the upper leaves often alternate.

* *Parts of the flowers in fives.*

1. H. cinerea, DC. ⊙ .1 to .15, *ash-colored,* hirsute ; stems thick, ascending. Leaves *oblong-linear.* Flowers sessile, 7-10 in crowded clusters ; calyx-lobes oblong *beset with bristles of equal length, nearly as long as breadth of sepals ;* styles short, distinct — Spring — Sterile fields and roadsides ; throughout, even in deserts.

2. H. hirsuta, L. ⊙ or ♃ .1 to .3, *hirsute.* Leaves *oblong-elliptical,* tapering at base. Flowers sessile, 7-10 in a head ; calyx-lobes oblong, *beset with short bristles, the terminal longer, stigmas subsessile* — Spring and Summer — Waste places ; coast and Lebanon.

3. H. glabra, L. ⊙ or ♃ .05 to .15, *glabrous.* Leaves oblong, tapering at base, sometimes ciliate. Flowers sessile, 7-8 in alternate clusters opposite the leaves ; calyx-lobes ovate, obtuse ; style very short, bifid with divergent stigmas — Spring and Summer — Fields ; subalpine Lebanon and Antilebanon to Aleppo, Aintâb, Amanus, and northward.

Var. **tenera,** Post. Tender. Flowers often solitary. Leaves oblong-linear — Aintâb.

4. H. incana, Lam. ♃ .1 to .3, *velvety-canescent ;* stems woody below. Leaves obovate-oblong to oblong-spathulate. Flowers *pedicelled,* 3-6 in a head or solitary ; calyx-lobes ovate, hirsute, with loose, white, equal hairs ; stigmas subsessile, forked — May and June — Mountains of Galilee to Lebanon.

* * *Parts of flower in fours. Stamens two.*

5. H. hemistemon, I. Gay. ♃ *Umm-Libbaidah.* .05 to .1, velvety, densely tufted ; stems brittle, filiform. Leaves oblong ; *stipules brown.* Flowers sessile, glomerate-spiked ; calyx-tube hispid, the outer two lobes herbaceous, fleshy, *deltoid-spathulate, four times as long as the ovate, membranous, inner pair ;* styles 2, long, *free from base* — May — Judean desert, el-Ghor, et-Tîh and southward to Sinai and Egypt.

5. PARONYCHIA, Tourn. Whitlow-wort. *Hhashîshat-ed-Dâhhis.*

Calyx-lobes 5, plano-concave or hooked at apex. Petals filiform. Stamens 5 or 3, inserted at the throat of the calyx. Style bifid. Utricle membranous, included in the calyx, rupturing irregularly at base. Seed erect, radicle superior — Opposite leaved herbs, with flowers nearly or quite hidden by silvery-scarious, often oblique bracts.

* *Calyx-lobes herbaceous, not hooded at apex, plano-concave.*

† *Calyx-lobes nearly equal.*

1. P. capitata, Koch. ♃ .1 to .15, often shrubby at base ; *branches rather long, ascending or prostrate.* Leaves obovate to oblong, .003 to .005 long, rather obtuse, appressed-puberulent. Heads .015

broad ; bracts large, round-ovate, acute or obtuse, mucronate ; calyx-lobes hairy, oblong-linear — June and July — Rocky places ; alpine Cassius, Amanus, and northward.

2. P. imbricata, Boiss. et Haussk. ♃ .03 to .1, *densely tufted*, shrubby at base, branches very short. Leaves stiff, .002 long, *imbricated*, *4-ranked*, *fleshy*, appressed-puberulent, oblong-linear, obtuse ; stipules acute, longer than the leaves. Heads .008 to .01 broad ; bracts ovate-triangular, acuminate, a little longer than the flowers ; lobes of appressed-hairy calyx oblong, obtuse — June — Fissures of calcareous rocks near Aintâb.

3. P. nivea, DC. ♃ .1, hirsute. Leaves oblong-lanceolate, acute. Heads .01 broad ; bracts ovate to oblong, acute, longer than calyx ; calyx-lobes *nerved*, linear-lanceolate, hirsute — Spring —

Var. **attenuata,** Post. Branches .1 to .15 long, straggling, *the internodes much longer than the minute leaves ;* heads few, at apex of stems — 'Ain-Hesbân to 'Ammân, (Moab).

Var. **obtusa,** Post. Densely tufted. Bracts orbicular-ovate, obtuse — Moab ; Gilead ; Bethlehem ; Hebron.

† † *Calyx lobes unequal.*

4. P. Kurdica, Boiss. ♃ .05 to .15 ; base often indurated ; branches tomentellous, ascending or prostrate. Leaves tomentellous, oblong-linear, .003 to .004 long, rather obtuse. Heads .002 to .004 broad ; bracts ovate, acuminate ; lobes of hairy calyx short, oblong-lanceolate, obtuse, sometimes recurved at apex — Spring — Rocks ; Hamath to Palmyra, Aleppo, Aintâb, and north-eastward.

5. P. macrosepala, Boiss. ♃ .05 to .1, pubescent ; stems ascending, leafy. Leaves oblong, .005 to .008 long, obtuse or acutish. Heads crowded, .005 to .01 broad ; bracts ovate, acuminate, lobes of appressed-hirsute calyx *linear-lanceolate*, obtuse, *obsoletely nerved at base* — May and June — Lebanon.

6. P. Sinaica, Fresen. ♃ .03 to .1, shrubby at base, with ascending branches. Leaves oblong-linear, .002 to .003 long, obtuse or acutish. Heads .005 to .01 broad ; bracts orbicular, acuminate or muticous ; lobes of hairy calyx *minute*, keeled, oblong-linear, acute, very unequal — May — Sinai.

Var. **flavescens,** Boiss. Bracts larger, yellowish, muticous — Borders of et-Tîh.

N.B. The last three species may better be considered as varieties of P. nivea, DC.

* * *Calyx-lobes semi-scarious, hooded, mucronate on back near apex.*

† *Perennials. Heads* .01 *broad.*

7. P. argentea, Lam. ♃ .3 to .5, prostrate, diffuse. Leaves glabrous, obovate to oblong and lanceolate, acute. Heads lateral and terminal, dense, intermixed with leaves ; bracts ovate, acute, much longer than flower ; calyx-lobes oblong, *margin narrower than the herbaceous portion* — Spring and Summer — Dry places ; common throughout.

Var. **velutina,** Post. Leaves velvety, linear-oblong, acute, crowded. Flowers in terminal heads — Duma, Lebanon.

Var. **scariosissima,** Post. Stipules acuminate, over-topping, and almost hiding the leaves — Coast.

† † *Annuals. Heads .003 broad, or less.*

8. P. Arabica, L. ⊙ .1 to .3, *puberulent;* branches filiform, prostrate, sparingly leafy. Leaves oblong to lenticular .003 to .006 long, mucronate. Heads numerous, few flowered, *along the lateral and terminal branches;* bracts *oblong-lanceolate,* acuminate, equalling or over-topping the flowers ; scarious margin of calyx-lobes *much broader than the herbaceous part ; awn as long as lobe* — May — Sands ; Gaza and southward.

9. P. desertorum, Boiss. ⊙ *Rukhaimah. Libbeit.* .1 to .2, *velvety-canescent,* diffuse. Leaves and stipules *densely imbricated below,* the leaves oblong-lanceolate, mucronate. Heads few-flowered, *disposed in elongated, narrow panicles ;* bracts *ovate,* acute, somewhat longer than flowers ; scarious margin of calyx-lobes *somewhat broader than the herbaceous part ; mucro short* — April and May — Sands ; Sinai and westward.

6. GYMNOCARPUM, Forsk. Gymnocarpum. *Karad.*

Calyx herbaceous, urn-shaped at base, the 5 lobes somewhat hooded at apex, apiculate at back, at length indurated. Petals 5, setaceous. Stamens 5, inserted at throat of calyx, opposite its lobes. Style elongated, stigmas 3, short, filiform. Ovary sessile, ovule pendulous from apex of basilar funicle, free, compressed. Utricle membranous, indehiscent, at length ruptured at base. Embryo horse-shoe-shaped, radicle superior — A Salsola-like, branching shrub, with opposite leaves, flowers in capitate, short-peduncled, axillary or terminal cymes.

G. fruticosum, Pers. ♄ *Sirr. Jerad Karad.* .1 to .3 ; bark greyish white ; branches zigzag, with short nodes. Leaves oblong-linear, terete, mucronulate ; stipules triangular, short. Bracts lanceolate, much shorter than calyx ; calyx-tube pruinose ; lobes linear, reddish, with scarious margins — Spring — Hot valleys and rocks about the Dead Sea, and borders of et-Tîh, and southward to Sinai and Egypt, eastward to Persia.

7. SCLEROCEPHALUS, Boiss. Sclerocephalus.

Calyx cup-shaped at base, united with floral leaves and bracts, the 5 lobes erect, somewhat hooded, spiny below their tip. Petals 0. Stamens 5, inserted at the margin of the membranous disk of the calyx which lines its tube, opposite its teeth ; filaments thread-like, very short ; anthers ovate-globular. Ovary membranous, adnate below to calyx-tube, free at apex. Style bifid, with somewhat recurved, stigmatose branches. Ovule suspended from a flat, membranous-margined, basilar funicle. Utricle irregularly torn at apex. Seed ovate, somewhat compressed ; embryo annular ; pedicle superior — Annual, prostrate herbs, with spherical, 4-7-flowered heads, in fruit concreted with the spiny, indurated, echinate, floral leaves, and deciduous with their short, jointed peduncle.

S. Arabicus, Boiss. ⊙ .02 to .1. Leaves linear-terete, mucronate; stipules scarious, very acute. Floral leaves somewhat longer than calyx; bracts acute, membranous, shorter than calyx; calyx-teeth straight, convex at back, crisp-woolly — Spring — Sinai, and southward and eastward.

8. CORRIGIOLA, L. Corrigiola.

Calyx persistent, 5-parted into obtuse, margined lobes. Petals 5, perigynous, round, as long as calyx. Stamens 5, inserted on the margin of the small disk. Ovule 1, inserted at apex of basilar funicle, reflexed. Styles 3, very short. Nutlet ovate-triquetrous, included in calyx, deciduous with it — (Ours) annual herbs, with fleshy leaves and scarious stipules.

C. littoralis, L. ⊙ .3 to .4, glaucescent; stems filiform. Leaves linear-oblanceolate to linear; stipules semi-sagittate, acuminate. Flowers in head like corymbs, .003 to .004 broad — May to September — Sandy places along coast.

9. SCLERANTHUS, L. Knawel.

Calyx-tube urn-shaped, at length indurated, lobes 5, muticous. Petals 5; filiform, sometimes abortive. Stamens 5, opposite the calyx-lobes, inserted above the ring at its throat. Ovary free, ovules pendulous from apex of basilar funicle. Styles 2, distinct. Utricle indehiscent, deciduous with calyx — Low herbs, with awl-shaped leaves.

S. verticillatus, Tausch. ⊙ .1 to .15. Flowers .002 long, in cymose clusters or corymbs in the axils; calyx-lobes somewhat longer than tube, tapering, acutish, in fruit somewhat open — Summer — Dry places; Aintâb to Aleppo and northward.

10. HABROSIA, Fenzl. Habrosia.

Calyx slightly united below, gibbous at base, the 5 lobes long-aristate. Petals 5, inserted at the throat of the calyx, obovate-spathulate. Stamens 5, with quadrate-lobed margins, inserted on the disk of the calyx, lining its tube; filaments very short; anthers twin-globular. Styles 2, free. Utricle indehiscent. Seed globular — Dwarf, annual herbs, with aspect of Alsine.

H. spinuliflora, Sev. ⊙ .05 to .15, glabrous; stem erect, filiform, forked, paniculate, with setaceous branches. Leaves setaceous, obtuse from a dilated base. Pedicels longer than calyx, at length spreading; lobes of calyx scarious-margined, *ending in an awn as long as they;* petals white, about half as long as calyx — March to May — Dry hills; Damascus to Palmyra, Aleppo, Aintâb, and eastward.

11. PTERANTHUS, Forsk. Pteranthus. *Basûmah.*

Calyx closed, 4-parted into straight, oblong-linear lobes, hooded and tipped with a vertical, scarious-margined, spiny appendage, the external much broader, more keeled. Petals 0. Stamens 4, opposite the calyx-lobes, connate at base in a cup; anthers ovate. Ovule 1, erect, from base of ovary. Stigma bifid. Utricle indehiscent. Seed compress-

ed — Annual fleshy herbs, with three-branched cymes, borne on a common peduncle, which becomes dilated, leaf-like in fruit, and falls with the cyme ; the central branch 1-flowered, the lateral pinnatipartite, sterile.

P. echinatus, Desf. ⊙ .1 to .3, stems 2-3-chotomously branched, ascending or procumbent. Leaves linear, fleshy. Cymes disposed in a corymbose, leafy panicle, papillose-hairy ; *lobes of sterile branches of cyme imbricated, hooked at tip* — March to May — Sandy places ; wilderness of Judea and Moab to Sinai, and southward, and eastward.

12. COMETES, Burm. Cometes.

Calyx closed, with 5, straight, rather concave lobes. Petals (or sterile filaments) 5, strap-shaped, adnate to the staminiferous cup. Stamens 5, opposite the calyx-lobes, the base united into a cup ; anthers oblong. Ovule 1, erect. Style filiform, exserted, trifid at apex, with stigmatose branches. Utricle indehiscent. Seed oblong, compressed — Annual herbs, more or less scabrous, with subulate stipules, erect, 2-3-chotomous stems, and three-branched cymes, on an unchanged petiole, which falls with the cyme at maturity ; the central branch 1-flowered, the lateral sterile, multipartite into pinnatipartite, plumose, rust-colored bristles, which grow longer in fruit.

C. Abyssinica, R. Br. ⊙ More or less scabrous-papillose, with branching hairs. Leaves linear-lanceolate, mucronate. Calyx-lobes oblong, hooded at apex, mucronate ; petals longer than filaments — Spring — Southern Sinai and southward.

Order XVI. MOLLUGINEÆ, (Indian Chickweed Family).

Herbs or shrubs, with regular, hermaphrodite flowers, alternate or pseudoverticillate leaves, 5 persistent sepals, 3-5 stamens inserted at base of calyx, a free, incompletely or completely, many-celled ovary, numerous amphitropous ovules, attached by a short funicle to a central placenta, or the central angle of the cells. Petals indefinite or 0. Capsule membranous, loculicidal. Embryo annular, surrounding the farinaceous albumen. Leaves with or without stipules.

1. TELEPHIUM, L. Telephium.

Sepals 5. Petals 5, inserted on an obscurely perigynous disk at the bottom of the calyx. Stamens 5, opposite the sepals. Styles 3, recurved. Capsule 3-4-valved, incompletely 3-4-celled by means of septa arising from valves. Seeds many, globular-reniform, affixed to a central placenta — Fleshy herbs, with alternate, stipuled leaves, and flowers in terminal, capitate cymes.

1. **T. Imperati,** L. ♃ .3 to .4, glabrous, glaucous ; stems numerous, simple, prostrate. Leaves oblong-spathulate, obtuse, .01 to .02 long. Sepals oblong ; capsule pyramidal, *tapering into a beak*, 15-20-seeded ; seeds kidney-shaped, compressed —

Var. **Orientale,** Boiss. Leaves generally narrower than in type ; the upper elliptical-linear, somewhat acute. Capsule about a third longer than calyx — June to October — Lebanon and Antilebanon to Aintâb, Marash, and northward.

2. T. sphærospermum, Boiss. ⊙ ② .1 to .25, glabrous, glaucous ; stems prostrate, simple, leafy. Leaves .005 to .008 long, oblong-elliptical, sometimes acutish. Capsule ovate-triquetrous, *without a beak*, 25-30-seeded ; seeds small, globular — Spring and early Summer — Sinai.

2. GLINUS, Lœffl. Glinus. *Ghubeirah.*

Sepals 5, equal. Petals 0 or indefinite, nearly perigynous, strap-shaped, often 2-3-fid. Stamens 3-20, inserted at the bottom of the calyx, distinct or aggregated in groups. Styles 3-5, straight. Capsule ovate-pentagonal, 3-5-grooved, incompletely 3-5-celled by means of septa arising from valves. Seeds kidney-shaped, affixed to the central angle of the cell ; caruncle entire — Annual, woolly herbs, with exstipulate, alternate, pseudoverticillate leaves.

1. G. lotoides, L. ⊙ *Ghubeirah.* .3 to .5 ; stems prostrate, forked, branching. Leaves round-obovate to oblong-spathulate. Flowers clustered at axils, with unequal pedicels ; sepals elliptical, *nearly muticous ;* petals entire or bifid ; stamens 12 ; styles 5 — Summer — Ditches and inundated places, along the coast.

2. G. dictamnoides, L. ⊙ Stems prostrate, forked, branching. Leaves small, orbicular to obovate, long-petioled. Flowers half as large as in last, clustered in axils, with unequal pedicels ; sepals oblong, hooded, *mucronulate*, acute ; petals 0 ; stamens 10 ; styles 3 — Spring — Inundated places near Rasheîyah.

Order XVII. PORTULACACEÆ. (Purslane Family).

Herbs with succulent leaves, and regular, unsymmetrical flowers ; the calyx lobes usually fewer than the petals ; the stamens opposite the petals, if of the same number, but often indefinite — Calyx-lobes 2 (rarely 3) imbricated in the bud. Petals 5 (rarely 4-6), (in ours) perigynous, slightly connate at base, inserted on the calyx. Stamens adnate to base of petals. Ovary (in ours) half adnate to calyx-tube, 1-celled ; ovules many, amphitropous, affixed by free or united funicles to a columnar, central placenta. Styles 5-6-fid. Capsule membranous, (in ours) opening by a lid. Embryo peripheral.

PORTULACA, L. Purslane. *Boql.*

Calyx lobes 2, at length deciduous. Petals 4-6, inserted at top of calyx-tube. Stamens 8-15, perigynous.

P. oleracea, Purslane ⊙ *Boql.* ⊙ .2 to .5 glabrous, prostrate. Leaves sessile, obovate-oblong. Flowers sessile in forks ; sepals un-

equal, obtuse, keeled beneath apex ; petals yellow — Spring and summer — Moist places ; common throughout.

ORDER XVIII. TAMARISCINEÆ. (TAMARISK FAMILY).

Shrubs or trees, with regular, usually hermaphrodite flowers, a 4-5-*lobed or parted calyx imbricated in the bud,* 4-5-*petals imbricated in the bud inserted under the hypogynous disk, a free* 1-*celled ovary developing into a capsule with as many valves as the styles* — Stamens 4-∞ inserted on the disk, free or variously united at base. Styles 3-5. Seeds few or many, anatropous, with or without albumen, hairy all over or with a tuft of hairs at tip ; embryo straight ; radicle superior.

TRIBE I. **TAMARISCEÆ.** Seeds with a tuft of hair at tip, not albuminous. Flowers in spike-like racemes.

1. TAMARIX. Stamens free, or united only at base. Trees with minute, scale-like leaves.

TRIBE II. **REAUMURIEÆ.** Seeds hairy all over, albuminous. Flowers solitary, axillary or terminal.

2. REAUMURIA. Stamens 5-adelphous, the groups opposite the petals. Low shrubs.

1. TAMARIX, L. TAMARISK. *Tarfa. Athl.*

Calyx 4-5- (rarely 6-) parted. Petals 4-5 (rarely 6). Stamens 4-10, inserted on a glandular, crenate disk ; filaments free, or united only at base. Styles 3-4, (rarely 2-5), sometimes very short. Capsule 1-celled, valves 3-4, bearing the septiform placentæ on their lower half. Seeds produced into a hairy beak — Shrubs or trees, with deciduous branches, minute, scale-like leaves, and hermaphrodite or rarely diœcious flowers.

* *Racemes lateral, appearing before or with the leaves in Spring.*

† *Stamens usually more numerous than 5-merous sepals and petals*

1. T. Syriaca, Boiss. ♄ 3 to 6, glabrous, green. Leaves sessile, lanceolate, scarious at tip. Racemes short-peduncled, *loose*, .004 in diameter. Petals ovate, hooded, erect ; stamens 6-8, inserted between the twin glands of the disk ; styles 3-4, half as long as ovary — Spring — Coast near Sidon.

† † *Stamens as many as sepals.*

‡ *Flowering racemes* .006 *or more in diameter. Flowers* 4-*merous.*

2. T. tetragyna, Ehr. ♄ 3 to 5, *glaucescent*, glabrous. Leaves lanceolate from a broad base, with smooth margins. Racemes *peduncled*, .08 to .1 long, rather loose ; bracts scarious, a little shorter than flowers ; pedicels about as long as calyx ; petals obovate-elliptical, spreading ; stamens inserted on lobes of disk ; styles coherent at base, spathulate, somewhat less than half as long as ovary — Spring — Coast near Carmel ; Desert of et-Tîh ; and southward.

3. T. tetrandra, Pall. ♄ 1 to 4, glabrous, *green* with *black bark*. Leaves short-adnate at base, lanceolate, with translucent cartilaginous margins, acute. Racemes *subsessile*, rather loose ; bracts long

er than pedicels ; petals oblong-elliptical, erect, rather persistent ; stamens inserted in the retuse lobes of the disk ; anthers minutely apiculate ; styles club-shaped — March and April — Bed of the Beirût River, and other streams of Phœnician coast.

‡ ‡ *Flowering racemes scarcely .004 broad. Flowers 4-5-merous.*

4. T. Jordanis, Boiss. ♄ 5 to 8, glabrous, glaucescent. Leaves half-clasping, ovate, *cuspidate, membranous at apex.* Racemes peduncled, .03 to .05 long, loose ; bracts lanceolate, acute, longer than the pedicels ; petals ovate-elliptical, erect ; lobes of disk 5, retuse ; filaments linear, inserted into the notches of the disk ; anthers apiculate ; styles 3, club-shaped, a little more than half as long as ovary — March and April — Banks of the lower Jordan.

* * *Racemes later than leaves, terminal, panicled. Flowers 5-merous.*

† *Stamens as many as sepals and petals.*

‡ *Leaves not sheathing.*

§ *Petals persistent.*

5. T. Pallasii, Desv. ♄ 3 to 6, glabrous, glaucescent. Leaves half-clasping, ovate or deltoid-cordate, acute. Racemes .02 to .05 long, subsessile or peduncled, dense, stiff ; bracts oblong, acute, longer than the very short pedicels, often as long as flower ; petals obovate, oblique ; lobes of disk 5, more or less retuse or bifid ; filaments filiform, inserted between lobes of disk ; anthers oblique, scarcely apiculate ; styles club-shaped, as long as ovary — March to July — Moist places and banks of streams. The most widely diffused of all the species in our district, readily distinguished by its short, slender racemes, and filiform twigs, with very minute leaves.

Var. **Smyrnensis,** Boiss. Green. Racemes spike-like, .01 to .03 long, crowded — Phœnicean coast.

Var. **Tigrensis,** Bunge. Glaucous. Flowers minute ; racemes dense — Hamath.

§ § *Petals soon deciduous.*

6. T. Nilotica, Ehr. ♄ 5 to 8, glabrous, glaucescent or green. Leaves half-clasping, ovate or deltoid, cordate, acute. Racemes loose ; bracts longer than pedicels ; petals obovate-oblong ; filaments inserted into the deeper notches of the 10-lobed disk ; anthers apiculate ; styles half as long as ovary — Spring — Said by Tristram to be found in the southern desert.

7. T. mannifera, Ehr. ♄ 3 to 5, glabrous, glaucous, or white-powdery ; branches rather rigid. Leaves half-clasping, ovate-deltoid, acute. Racemes rather short, dense, spreading ; bracts, acute, longer than pedicels ; petals obovate-oblong, tapering at base, inserted into the 5, retuse lobes of the disk ; anthers somewhat apiculate ; styles 3, obovate, one-third as long as ovary — Spring — Callirrhoë to Arabia Petræa, and southward and eastward.

‡ ‡ *Leaves sheathing, abruptly mucronulate, pitted.*

8. T. articulata, Vahl. ♄ *Athl.* 5 to 10, rarely flowering in our district, glabrous, glaucous. Racemes short peduncled, slender,

rather dense ; bracts sheathing, acute, shorter than nearly sessile flowers ; petals linear-oblong ; filaments filiform, inserted into the deeper notches of the 10-lobed disk ; styles 3, obovate, nearly half as long as ovary — Summer — A'yun Musa, and elsewhere along the western borders of the Tîh.

† † *Stamens (in ours)* 10, *twice as many as sepals and petals.*

9. T. macrocarpa, Bunge ♄ 3 to 5, green or glaucescent, glabrous. Leaves pitted, nearly clasping, cordate. Racemes .05 to .1 long, loose ; bracts about as long as pedicels ; petals ovate-elliptical ; lobes of disk 10, tapering into the filaments of the 10 stamens ; anthers apiculate ; styles short ; capsules .01 long — March — Ain-Hhauwara, western border of et-Tîh, and westward.

2. REAUMURIA. L. Reaumuria. *Mellâhh.*

Calyx 5-lobed or parted, many-bracted at base. Petals 5, equal or unequal, with a longitudinal, fringed, adnate scale on both sides of base. Stamens ∞, connate at base, in 5 groups opposite the petals, inserted into a fleshy ring surrounding the base of the ovary. Ovary globular-pentagonal. Styles 5, filiform. Placentæ septiform, 4-10-ovuled, erect, fixed at base and apex, otherwise free. Capsule cartilaginous, with 5, persistent, at length deflexed valves. Seeds few, fleshy — Glaucous, much branched shrubs or small trees, with coriaceous or fleshy, dotted leaves.

* *Leaves sessile. Lobes of calyx not heart-shaped at base.*

1. R. hirtella, Jaub. et Spach. ♄ .2 to .4, hirtellous; branches erect. Leaves half-terete, oblong-linear, from a subcordate base, obtuse, those of the axillary twigs much crowded. Bracts *dense, shorter than calyx, erect, oblong ;* lobes of calyx oblong, *with an obtuse triangular tip ;* petals somewhat oblique, a little longer than calyx ; dilated part of filaments *crenate-dentate* — March to July — Sands ; Sinai, and westward.

2. R. Palæstina, Boiss. ♄ .3 to .4, puberulent, irregularly racemose-paniculate. Leaves half-terete, linear, retuse at base, the axillary clustered, short. Bracts *linear, loose, longer than calyx, spreading-recurved ;* calyx lobes *triangular-lanceolate, acuminate,* obtuse ; petals elliptical, somewhat oblique, once and a half as long as calyx ; dilated part of filaments *not dentate* — March to June — Clayey soil in hot valleys around the Dead Sea, and southward to Sinai.

* * *Leaves tapering at base, flat. Calyx lobes subcordate at base.*

3. R. Billardieri, Jaub. et Spach. ♄ Glabrous ; branches panicled. Leaves *ovate,* acute, *none in axils,* those of flowering branches linear, short. Bracts acute, longer than calyx, spreading ; lobes of calyx spreading, ovate-deltoid, acuminate ; petals obcordate, the alternate lobes obsolete ; dilated part of filaments crenate-dentate — Summer — Syrian desert.

Order XIX. ELATINEÆ. Cambess. (Water-Wort Family).

Little, glabrous, marsh annuals, with opposite, dotless leaves, membranous stipules, and minute, axillary flowers—

Sepals 2-5, imbricated in the bud. Petals hypogynous imbricated in the bud. Stamens hypogynous, free, as many or twice as many as petals. Anthers 2-celled. Ovary free, with cells and styles as many as sepals; stigmas capitate; cells with numerous, anatropous ovules, affixed to central angle. Capsule septicidal, the placental column persistent. Seeds straight or curved, destitute of albumen.

ELATINE, L. WATER-WORT.

Flowers 4-merous. Sepals membranous, destitute of ribs. Ovary globular. Capsule membranous. Flowers solitary, bractless. Seeds rough, latticed.

E. campylosperma, Senb. Curved-seeded Water-Wort ⊙ .01 to .03. Leaves ovate-oblong, longer than petiole. Peduncles usually longer than leaf; stamens 8; seeds semicircular — Spring — Marshy places; Philistia, and southward.

ORDER XX. **HYPERICINEÆ,** DC. (ST. JOHN'S-WORT FAMILY).

Herbs or shrubs, with opposite (rarely verticillate) leaves, without stipules, dotted with pellucid glands and black points. regular hypogynous flowers, the petals usually oblique, imbricated or twisted in the bud. the stamens collected in 3-5 clusters, the ovary free, 1-*celled with* 3-5 *parietal placentæ and as many styles. or more or less completely* 3-5-*celled by the union of the placentæ in the centre, septicidal* — Calyx 5-parted, lobes imbricated in the bud. Anthers versatile. Ovules numerous or few, ascending or horizontal, anatropous. Fruit capsular. Seeds without albumen, straight or incurved.

1. **HYPERICUM.** **Petals naked at base. Hypogynous glands 0.**
2. **TRIADENIA.** **Petals appendaged at base. Hypogynous glands 3.**

1. **HYPERICUM,** L. ST. JOHN'S-WORT.

Petals naked at base. Stamens 3-5-adelphous at base, rarely nearly 1-adelphous. Hypogynous glands 0 — Perennial herbs or shrubs, with yellow flowers, and usually dotted, entire, opposite, extipulate leaves.

* *Stamens* 5-*adelphous. Petals deciduous,* .02 *long. Seeds winged.*

1 H. hircinum.

* * *Stamens* 3-*adelphous. Petals* .01 *or longer, persistent. Seeds cylindrical.*

† *Dichotomous shrubs. Leaves leathery, persistent, jointed at base.*

2 H. cardiophyllum, 3 rupestre, 4 nanum.

† † *Shrubby herbs; branches alternate or opposite. Leaves leathery, not jointed.*

5 H. serpyllifolium, 6 cuneatum.

† † † *Herbs, sometimes shrubby at base.*

‡ *Capsule marked with longitudinal, parallel grooves.*

§ *Seeds papillose.*

¶ *Inflorescence cymose-corymbose, or densely corymbose-panicled.*

7 H. scabrum, 8 læve.

¶ ¶ *Inflorescence cymose-racemose or loosely panicled.*

9 H. confertum, 10 hyssopifolium, 11 helianthemoides, 12 Kotschyanum.

§ § *Seeds linear-pitted, or nearly smooth.*

¶ *Leaves not heart-shaped.*

13 H. adenocladum, 14 retusum, 15 Amanum.

¶ ¶ *Leaves subcordate at base, often clasping.*

16 H. spectabile, 17 tetrapterum, 18 crispum, 19 lanuginosum, 20 Sinaicum.

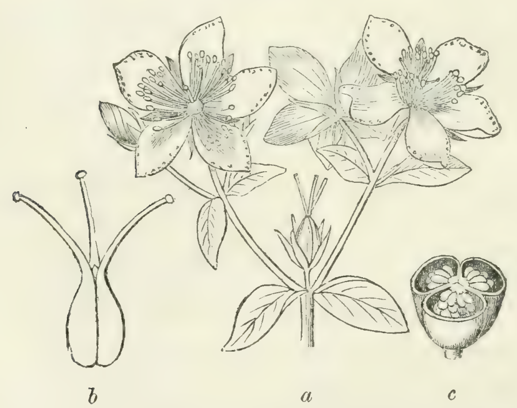
‡ ‡ *Capsule grooved at back, beset with vesicles at inner face.*

21 H. perforatum.

‡ ‡ ‡ *Capsule sprinkled with vesicles at back.*

22 H. Cassium.

FIG. 75.



(*a*) A cyme of Hypericum perforatum, showing the 5 sepals and petals of the flowers, the 3 bundles of stamens, and the 3 styles.

(*b*) The capsule, composed originally of 3 carpels, and surmounted by 3 styles.

(*c*) The same cut transversely, showing the seeds implanted at the central angle of thc 3 cells of the capsule.

1. H. hircinum, L. ♄ *Dumu'-el-busein. Rummân-el-anhâr.* 1 to 1.5, glabrous; branches erect, tetragonal. Leaves oblong, .02 to .05 long, tapering at apex, sessile, with decurrent margins. Cymes

terminal, few-flowered ; flowers .03 to .04 broad — Summer and autumn — Moist places ; coast and coast range to 1000 m., Amanus, Akherdagh, and northward. Its specific name is derived from the goat-like odor which it emits.

2. H. cardiophyllum, Boiss. ♄ 1 to 1.5, glabrous. Leaves .02 to .03 long, *ovate, obtuse, from a heart-shaped base,* sparingly pellucid-dotted. Cymes terminal, short-peduncled, crowded into a dense, many-flowered corymb — June — Calcareous rocks ; Antioch to Aleppo, Aintâb, and north-eastward.

3. H. rupestre, Jaub. et Sp. ♄ .3 to .4, glabrous. Leaves .01 to .03 long, ovate to elliptical or oblong from a *rounded or tapering base,* obtuse or retuse, pellucid-dotted above, glaucous beneath. Cymes terminal, 9-15-flowered, short-peduncled — Summer — Besherri.

4. H. nanum, Poir. ♄ .2 to .3, forming hemispherical clumps hanging from vertical rocks, glabrous. Leaves .01 to .015 long, round to ovate, sparingly pellucid-dotted. Cymes terminal, 3-9-flowered, very short-peduncled — April to July — Subalpine regions of Lebanon and Antilebanon, and mountains above Nablûs.

Var. **prostratum,** Boiss. Appressed to rocks. Leaves round-ovate to elliptical, sometimes acutish, .005 to .006 long ; cymes 2-5-flowered — Antilebanon.

5. H. serpyllifolium, Lam. ♄ .8 to 1, glabrous ; branches *wand-like.* Leaves .005 to .008 long, short-petioled, *elliptical,* glaucous and sparingly dotted below. *Cymes crowded at top of upper branches, forming a dense,* terminal corymb — May to August — Bushy hillsides ; coast and lower mountains.

6. H. cuneatum, Poir. ♄ .2 to .4, glabrous ; stems numerous, red. Leaves .01 to .02 long *cuneate at base,* short-petioled, *elliptical to obovate,* entire or somewhat repand, glaucous beneath, sparingly black-dotted. Flowers in *short, leafy racemes* — April to July — Fissures of rocks ; Lebanon and Amanus, to a height of 2000 m. and northward.

Var. **fragile,** Post. Stems brittle, .1 long, tufted. Leaves minute. Racemes dense.

Var. **pallidum,** Post. Leaves glaucous on both sides, usually larger than in type.

7. H. scabrum, L. ♃ .4 to .5, glabrous, many-stemmed ; *stems glandular-roughened,* red, wand-like. Leaves *sessile, oblong-linear,* obtuse, with large pellucid dots. Cymes crowded into a *dense compound corymb* — May to August — Rocky hills ; mountains of Galilee to Lebanon, Antilebanon, Amanus, Aintâb, Akherdagh, and northward.

8. H. læve, Boiss. et Haussk. ♃ .4 to .5, glabrous ; stems numerous, nearly simple, red. Leaves sessile, with strongly convolute margins, *linear,* obtuse, pellucid-dotted. Cymes crowded into a *short, dense, corymbose* panicle — Summer — Calcareous hills ; Aintâb and northward, and eastward.

Var. **rubrum,** Boiss. Petals more or less deep red — With type.

9. H. confertum, Choisy ♃ .15 to .3, papillose-puberulent or glabrescent ; stems slightly 2-lined. Leaves pellucid-dotted, those of stem .005 to .01 long, *lanceolate from a truncate base*, those of axillary twigs and sterile branches .003 to .005 long, *revolute, cylindrical.* Cymes nearly sessile, forming an *interrupted raceme-like panicle ;* calyx-lobes *fringed with stipitate glands* — June and July — Open glades ; Amanus, and northward.

10. A. hyssopifolium, Vill. ♃ .3 to .6, glabrous ; stems with 2 prominent lines. Leaves .01 to .03 long, sessile, somewhat leathery, pellucid dotted, *oblong-linear to linear*, obtuse, with revolute margins. Cymes peduncled, forming a *narrow, elongated panicle ;* cells of ovary with 30-40 ovules — Summer — Rocky places ; Lebanon and Antilebanon to Amanus, Akherdagh, and northward.

Var. **Lydium,** Boiss. Pale green. Leaves narrow. Branches of panicle 5-7-flowered ; petals 3-4 times as long as calyx.

Var. **elongatum,** Boiss. Leaves narrow. Stems simple. Panicle narrow — Hamath ; Palmyra ; Cœlesyria.

Var. **latifolium,** Boiss. Stem leaves .004 to .007 broad, with scarcely revolute margins.

11. H. helianthemoides, Spach. ♃ .3 to .4, glabrous ; often shrubby below ; stems slender with 2 prominent lines, and numerous branches. Leaves pellucid-dotted, revolute, *linear-cylindrical.* Cymes peduncled, forming a long, narrow panicle, or 1-few-flowered, racemed ; cells of ovary 10-12-ovuled — May to August — Hilly and mountainous regions ; Galilee to Lebanon, Antilebanon, Jebel-el-Abiadh, Aleppo, Antioch, Amanus, and northward.

Perhaps better regarded as a variety of H. hyssopifolium, with smaller flowers and narrower leaves.

12. H. Kotschyanum, Boiss. ♃ .15 to .25, velvety-puberulent, canescent ; stems terete. Leaves oblong, obtuse, flat, *with several parallel nerves*, those of the axillary twigs much crowded, linear, revolute. Cymes peduncled, few-flowered, in a short, oblong panicle ; cells of ovary 25-30-ovuled — Summer — Rocky hills about Aintâb.

13. H. adenocladum, Boiss. ♃ .08 to .1, glabrous, shrubby at base ; *the low, simple stems and inflorescence densely beset with prominent, pellucid glands.* Leaves pellucid-dotted, oblong-linear to linear, obtuse, revolute. Cymes short-peduncled with crowded flowers, forming an ovate panicle, .03 to .04 long ; cells of ovary 12-15-ovuled — Summer — Amanus.

14. H. retusum, Auch. ♃ .3, glabrous ; stems black-dotted, with 2 prominent lines. Leaves sparingly pellucid- and black-dotted, linear, revolute, truncate at base and apex. Cymes peduncled, panicle .02 to .05 long, the lateral flowers sessile ; ovules 30-40 in a cell — Summer — Aintâb to Marash, and northward.

15. H. Amanum, Boiss. ♃ .5 to .8, glabrous, glaucescent ; stems nearly simple, with 2 prominent lines. Leaves sessile, rigid, sparingly pellucid-dotted, those of stem .015 to .03 long, *oblong to oblong-lanceolate*, acutish, those of the sterile stems .005 to .008 long,

linear-cylindrical. Cymes forming a thyrsoid, often broad panicle ; bracts serrulate; calyx-lobes glandular-denticulate — Summer—Woody zone of Cassius and Amanus.

16. H. spectabile, Jaub. et Spach. ♃ .4 to .8, glabrous, glaucescent ; stems with 2 prominent lines, usually simple. Leaves firm, .02 to .04 long, more or less connate or free at base, *ovate*, obtuse, with cartilaginous margin, the upper tapering. Cymes crowded in an oblong or ovate panicle ; calyx lobes *glandular-denticulate*, one-third as long as .01 long petals — Summer — Aintâb, and north-eastward. (*H. Leichtlini*, *Stapf.*)

17. H. tetrapterum, Fries. ♃ .2 to .5, stoloniferous at base ; stem 4-*winged*, *much branched*. Leaves .01 to .03 long, pellucid-dotted, with black dots at margin, all *half-clasping*, *ovate-oblong* or elliptical, obtuse. Cymes forming *a large*, *leafy*, somewhat corymbose panicle ; calyx lobes half as long as .006 long petals, entire, destitute of glands — Summer — Moist places, especially near springs ; along coast, and in lower mountains, and interior plains.

18. H. crispum, L. ♃ .2 to .3, glabrous, glaucescent, stems decussate-branched almost from base, forming *a pyramidal panicle*, *almost as broad as long*, with stiff, divaricating branches. Leaves .01 or less long, pellucid- and black-dotted, *lanceolate*, acute *with undulating margin*. Cymes *at ends of all the branches*, 1-3-5-flowered ; sepals ovate or oblong, never glandular-mangined, one-fourth as long as .006 long, oblong-linear petals — Summer — Waste fields and vineyards ; coast and inland plains ; common.

19. H. lanuginosum, Lam. ♃ .4 to 1, tomentellous canescent, except glabrous inflorescence ; stems terete. Leaves .02 to .05 long, *oblong to oblong-lanceolate*, the upper tapering, all sparingly pellucid-dotted, and black-dotted at margin. Cymes forming a broad panicle ; calyx-lobes glandular-denticulate, one-third as long as .008 long petals — May to July — Shady and moist places ; coast and mountains to 2000 m. throughout, except in Jordan Valley.

20. H. Sinaicum, Hochst. ♃. .1 to .3, velvety canescent, except glabrous inflorescence ; base shrubby ; stems numerous, ascending. Leaves .006 to .008 long, .003 broad, *elliptical*, pellucid-dotted. Cymes few-flowered, terminal, corymbose, glabrous, with short, divaricating branches ; calyx-lobes glandular-margined — Spring — Moist rocks ; Sinai.

21. H. perforatum, L. ♃ .5 to 1, glabrous green ; stem with 2 prominent lines, panicled-corymbose. Leaves .01 to .02 long, sessile, pellucid-dotted, *oblong-elliptical to oblong-linear*, black-dotted at margin, often revolute. Calyx lobes lanceolate, acute, entire, destitute of glands or dots, half as long as .015 long petals — Summer — Dry places ; coast and lower mountains.

22. H. Cassium, Boiss. ♃ .3 to .5, glabrous, glaucous. Leaves .02 to .04 long, rather rigid, black- but not pellucid-dotted, cordate, clasping at base, *ovate-oblong*, the upper acutish. Cymes composite, *corymbose*, the branches of cyme after flowering *racemed*, *stiff* ; sepals linear-lanceolate, acute, *in fruit deflexed*, sparingly black-dotted, margin *remotely denticulate*, *with short ascending teeth tipped by a gland* ; capsule

oblong-cylindrical, deeply 3-grooved, *covered with large globular vesicles* — Summer — Shady places ; Cassius and Amanus.

2. TRIADENIA, Spach. Triadenia.

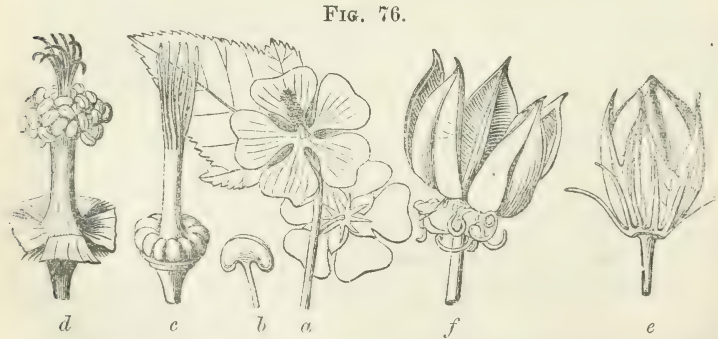
Petals furnished with a hooded appendage at face. Stamens triadelphous, with long strap-shaped androphores alternating with as many hypogynous glands. Capsule 3-celled. Seeds cylindrical, somewhat incurved — Branching, glabrous, glaucous shrubs, with small, fleshy, pellucid-dotted leaves, minute flowers, and sepals destitute of glands.

T. Russegeri, Fenzl. ♄ .2 to .3, branches tortuous. Leaves spathulate, obtuse. Axils usually clustered. Sepals oblong, rather acute ; petals and stamens deciduous ; cells of ovary 2-ovuled, styles one-third to one-half as long as ovary — Summer — Suedîyeh.

Order XXI. MALVACEÆ. (Mallow Family).

Mucilaginous herbs or shrubs, with alternate, stipulate, palmately veined leaves, and regular hermaphrodite, axillary flowers, on jointed stalks, the calyx-lobes 5, *valvate in the bud, the petals* 5, *convolute in the bud, adnate at the base to the column of the monadelphous stamens, the anthers kidney-shaped, opening at the top*, 1-*celled, the style simple, included in the column of the filaments, branching above* — Calyx usually involucrate with a whorl of more or less united or free bractlets. Ovary several- to many-celled, the cells with 1-several campylotropous or anatropous ovules. Fruit capitate or whorled, the carpels at length separating from the axis, or a many-celled capsule, splitting down the back of the cells. Albumen little or 0 ; embryo straight or curved ; cotyledons leafy, folded.

Fig. 76.



(*a*) Flowers of Althæa officinalis, showing the involucre, calyx, corolla, and column of stamens around the style. (*b*) An anther, showing its reniform shape, and the slit along its upper edge for the escape of the pollen. (*c*) The pistil, showing the ovaries, and the staminal column. (*d*) Bases of the petals, the staminal tube, and the styles of a Malva. (*e*) Capsule of a Hibiscus. (*f*) The same, after its separation into its component follicles

TRIBE I. **MALVEÆ.** Staminal column anther-bearing to apex. Branches of style as many as carpels. Mature carpels separating from axis.

* *Ovules one in each cell, ascending.*

1. ALTHÆA. Bractlets 6-9. Cells not divided by a transverse partition.
2. ALCEA. Bractlets 6-9. Cells partially divided by a transverse partition.
3. LAVATERA. Bractlets united into a 3-fid involucre.
4. MALVA. Bractlets 3, distinct.

* * *Ovules one in each cell, pendulous.*

5. SIDA. Bractlets 0. Carpels dehiscent or 2-valved at top.
6. MALVALLA. Bractlets setaceous, short. Carpels inflated, indehiscent.

* * * *Ovules 2-several in each cell, some ascending, some pendulous.*

7. ABUTILON. Bractlets 0. Soft velvety or woolly shrubs with yellow flowers,

TRIBE II. **HIBISCEÆ.** Staminal column anther bearing below apex, naked and 5-toothed at apex. Branches of style as many as cells of ovary. Carpels united into a loculicidal capsule.

8. **HIBISCUS.** Bractlets numerous, linear or setaceous.

1. ALTHÆA, L. MARSH MALLOW. *Khutmî.*

Bractlets 6-9, connate at base. Calyx 5-fid. Branches of style filiform, stigmatose along their inner face. Carpels whorled around a torus shorter than they, flattened at back, indehiscent, not divided by a partition from the pericarps — Annual or perennial herbs.

* *Annuals.*

1. A. hirsuta, L. ⊙ .2 to .4, shaggy with long spreading hairs. Leaves round kidney-shaped, crenate, obsoletely lobed, to palmatipartite into 3-5, oblong, cut-crenate lobes. Peduncles solitary, 1-flowered, *longer than leaves;* involucre-lobes 7-10, linear-lanceolate, shorter than calyx; petals about as long as or longer than calyx; carpels glabrous — Spring — Fields; rather common, from coast to 1000 m.

2. A. Ludwigii, L. ⊙ Hirsute with clustered hairs; stems prostrate. Leaves glabrescent, round, the lower crenate, the others 3-5-lobed or parted into wedge-shaped segments, obtusely dentate at apex. Pedicels *very short, crowded;* involucre-lobes linear-setaceous; calyx-lobes lanceolate; petals somewhat longer than calyx; carpels glabrous — Spring — Arabia Petræa.

* * *Perennials.*

3. A. officinalis, L. ♃ Common, or officinal March Mallows. .6 to 1, woolly. Leaves cordate to ovate, unequally toothed, more or less 5-3-lobed. Peduncles 1-several-flowered, *much shorter than the leaf;* involucre lobes 7-10, linear-lanceolate, half as long as calyx; petals twice as long as calyx; carpels woolly—Summer—Ditches; Damascus to northern Syria, and northward.

4. A. Armeniaca, Ten. ♃ .6 to 1, tomentellous. Leaves 5-3-palmately parted or cut into obovate to oblong, sinuate-toothed, or linear-lanceolate, lobes. Peduncles *crowded*, generally several-flowered, *as long as the leaves or longer;* involucre-lobes lanceolate, half as long as calyx; petals twice as long as calyx—Summer—Bushy places; Marash.

5. A. cannabina, L. ♃ 1 to 1.5, stellate—pubescent, *scabridulous.* Leaves green, paler beneath, palmately parted or cut into short-petioled,

narrow, oblong-lanceolate, coarsely serrate lobes. Peduncles 1-2 in the axils, 1-2-flowered, 2-5 times as long as leaves ; involucre-lobes 7-8, *lanceolate, somewhat shorter than calyx ;* petals twice and a half as long as calyx — Summer — Hedges and thickets ; Amanus to Aintâb, and northward.

6. A. Kotschyi. Boiss. ♃ 1 or more, sparingly *soft* stellate-hairy. Leaves palmately parted or cut into oblong-lanceolate, serrate-dentate lobes. Peduncles long, 1-flowered, panicled-corymbose ; involucre-lobes 6-7, *triangular, half as long as calyx ;* petals twice as long as calyx — Summer — Bushy hillsides ; Amanus, and northward.

Althæa rosea, L., and A ficifolia, are the garden Hollyhocks.

2. ALCEA, L. Alcea. *Khutmi.*

As in the last, save that the cells of the capsule are partly divided transversely by an inward projection of the pericarp, the upper division being small and empty. The anthers twisted after shedding their pollen.

* *Calyx-lobes striate.*

1. A. acaulis, Cav. ♃ .2 to .5, *grey-woolly, stemless or caulescent, prostrate, flowering from base.* Leaves *long petioled, kidned-shaped,* crenate, sometimes obtusely 5-lobed. Flowers sessile or short-peduncled, usually crowded ; involucre one-third as long as calyx ; petals purple pink or white, retuse, .03 to .04 long ; carpels glabrous, transversely wrinkled-pitted — Spring — Fields ; common, especially in interior table-lands.

Var. **longipes,** Post. Caulescent. Petioles sometimes .25 long. Peduncles 3-4 times as long as calyx, often .04 long — Bethel, Base of Carmel.

2. A. Haussknechtii, Boiss. ♃ .6 to 1, pale green, *scabrous-woolly ;* stem simple, ending in *a dense leafy raceme.* Leaves long-petioled, round heart-shaped, obtusely 5-7-lobed. Lower peduncles sometimes as long as calyx, upper much shorter ; involucre-lobes traingular, one-third as long as calyx ; calyx-lobes lanceolate, acute ; petals 2-lobed, long-clawed, *deep violet ;* carpels glabrous, transversely wrinkled — Summer—Fields ; Jisr Sheikh 'Ayyash to Tartoos ; Tchermalik (northern Syria). This species may be a long stemmed form of A. acaulis, Cav.

3. A. rufescens, Boiss. ♃ .2 to .8, woolly ; stem branched below, branches almost leafless above. Leaves round, heart-shaped or truncate at base, obtusely lobed. Flowers nearly sessile ; involucre *one-third as long as calyx ;* calyx-lobes triangular, acute ; petals *yellow*, retuse, often drying greenish ; carpels hairy, grooved at back, and transversely wrinkled—Summer—Waste fields ; table-lands of interior ; Banias.

4. A. lavateræflora, DC. ♃ .8 to 1.5, woolly ; stem erect, simple. Leaves long-petioled, *palmatipartite or cut into spathulate to oblong-obovate,* obtuse, irregularly *crenate-lobulate* lobes. Flowers subsessile ; *involucre a little shorter than calyx* ; calyx-lobes triangular-lanceolate ; petals obcordate, *intensely violet ;* carpels puberulent, wrinkled

on both sides; seeds minutely white-dotted—Spring and summer—Hillsides; central Palestine, and northward. Lake of Tiberias.

Var. **pallida**, Post. Flowers pale pink to white—Marash.

5. A. setosa, Boiss. ♃ .6 to 1.5, *bristly;* stem simple. Leaves sparingly hairy, round heart-shaped, *obtusely 5-7-lobed.* Raceme long, usually leafless except at base. Peduncles *as long as involucre* or shorter; involucre somewhat shorter than calyx, both woolly, calyx-lobes triangular; petals obcordate, intensely purple; young carpels hairy at back—Summer—Common along coast, and to middle zone of mountains and table-lands.

6. A. striata, DC. ♃ 1 or more, tomentellous. Leaves round-heart-shaped, with 3-5 obsolescent, crenate lobes. Peduncles shorter than calyx; raceme loose, nearly leafless; involucre one-third as long as calyx; calyx-lobes lanceolate; petals obcordate, pale pink; carpels glabrous, wrinkled, hairy to the middle line of the flattish back—Valley of Rephidîm (Sinai).

* * *Calyx-lobes not striate.*

7. A. apterocarpa, Fenzl. ♃ 1 or more, appressed-woolly, canescent; stem ending in a long, loose, generally leafless raceme. Leaves round-heart-shaped, obtusely 5-lobed. Flowers short-peduncled; lobes of involucre and calyx lanceolate, acute, the latter a little longer; petals pink or purple; carpels strongly wrinkled, obsoletely grooved, hairy — Summer — Lebanon; Nebo.

3. LAVATERA, L. LAVATERA.

Bractlets united into a 3-fid involucre. Calyx 5-fid. Branches of style filiform, stigmatose along their inner face. Carpels whorled around a conical or variously dilated torus, indehiscent — Herbs, sometimes shrubby at base, with aspect of Malva.

* *Flowers clustered. Torus small, conical.*

1. L. Cretica, L. ② .5 to 1, scabrous with branching hairs. Leaves round-heart-shaped, obsoletely 5-7-lobed to round, angular-lobed. Peduncles short or 0; lobes of involucre shorter than calyx, growing little in fruit, *entire*, ovate, obtuse; calyx-lobes acute or acuminate; petals violet, notched, 2-lobed, .015 long, 3-4 times as long as calyx — Spring — Roadsides and fields; common.

* * *Flowers solitary. Torus conical or hemispherical, exserted.*

2. L. punctata, All. Ped. ⊙ .3 to 1, scabrous with simple and clustered hairs. Lower leaves cordate to reniform, intermediate 3-5-fid into oblong to oblong-lanceolate lobes, the upper *hastate, or lanceolate,* all crenate, at length reflexed. Peduncles long, spreading; involucre *nearly as long as calyx,* growing in fruit, lobes auricled, acuminate; calyx lobes lanceolate, acuminate; petals wedge-shaped, truncate-retuse, .03 long, thrice as long as calyx — Spring — Fields; common throughout northern Palestine and Syria, especially along coasts and interior plains.

* * * *Flowers solitary. Torus expanded at top into a concave disk, covering the carpels.*

3. L. trimestris, L. ⊙ .2 to .5, hairy or glabrescent. Lower leaves kidney-shaped, crenate, intermediate cordate-ovate, angled, uppermost 3-lobed. Peduncles long ; involucre shorter than calyx, growing considerably in fruit, lobes triangular, often dentate ; petals wedge-shaped, truncate, .04 long, 4-5 times as long as calyx — Spring — Fields ; coast and mountains to 1000 m. ; Jordan Valley.

4. MALVA, L. Mallow. *Khubbâza. Khubbaizi.*

Bractlets 3, rarely 2, distinct. Calyx 5-fid. Branches of style filiform, stigmatose along their inner border. Carpels whorled around a short or conical torus, indehiscent — Annual or perennial herbs with pink flowers.

* *Peduncles solitary in axils,* 1-2-*flowered.*

1. M. Ægyptia, L. ⊙ .05 to .1, appressed-pubescent. Leaves orbicular, *bipalmatipartite* into short, oblong, ciliate lobes. Peduncles somewhat longer than the leaf ; bractlets 2, linear ; calyx-lobes triangular, acuminate, longer than bractlets, about as long as corolla —Spring — El-Jebel-el-Abiadh, between Hamath and Palmyra. Et-Tîh and southward, and westward.

* * *Peduncles clustered in axils,* 1-*flowered .*

† *Petals* .02 *or more long, with bearded claw.*

2. M. sylvestris, L. ⊙ Wood Mallow. .3 to .5, more or less hairy. Leaves round-heart-shaped, obtusely 5-7-lobed, dentate. Peduncles erect after flowering ; margin of carpels entire — Summer — Fields and waste places ; common.

Var. **oxyloba,** Post. Lobes of upper leaves oblong-lanceolate, acuminate — Tel-er-Ramé (Jordan Valley).

† † *Petals* .01 *long or less.*

‡ *Leaves round-heart-shaped, more or less obtusely* 5-7-*lobed.*

§ *Petals twice as long as calyx ; claws bearded. Margins of carpels entire.*

3. M. Nicæensis, All. Ped. ⊙ *Raqmeh.* .3 to .6, erect or diffuse, more or less hairy. Peduncles erect after flowering ; bractlets *oblong,* calyx-lobes triangular, growing after flowering — Spring — Weedy places and roadsides ; common.

4. M. rotundifolia, L. ⊙ ♃ Common Mallow. *Khubbaizi.* .3 to .6, usually clothed with clustered hairs, diffuse. Peduncles deflexed after flowering ; bractlets *linear,* acute ; calyx-lobes triangular, acute, erect after flowering, growing — Spring and summer — Weedy and neglected places ; everywhere.

Var. **perennans,** Post. ♃ Dwarf, prostrate, densely tufted. Leaves .01 to .02 broad — Inundated meadows near top of Akherdagh.

§ § *Petals a little longer than calyx ; claws glabrous, margin of carpels dentate.*

5. M. parviflora, L. ⊙ .3 to .6, more or less hairy or glabrescent, spreading. Peduncles short, at length spreading ; bractlets *very narrowly linear,* acute ; fruiting calyx growing much, *scarious,* lobes spreading, *short, round,* mucronate — Spring — Roadsides and waste places ; common.

Var. **arguta,** Post. Leaves acutely dentate — Tripoli. Banias.

‡ ‡ *Leaves round, 3-5-fid or parted, the divisions acutely cut-lobed.*

6. M. oxyloba, Boiss. ⊙ .3 to .4, nearly glabrous. Peduncles short, spreading in fruit ; bractlets *awl-shaped ;* calyx-lobes ovate-triangular, growing and spreading in fruit — Weedy places ; less common than the others. Perhaps a variety of the last.

5. SIDA, L. Sida.

Bractlets 0. Calyx 5-fid. Styles connate ; stigmas truncate or capitate. Carpels whorled, muticous or beaked, dehiscent or 2-valved at top, naked within — Herbs or shrubs with yellow flowers.

S. rhombifolia, L. ♃ or ♄ .5 to 1, glabrescent or sparingly velvety. Leaves rhombic-obovate to oblong, crenate or crenate-dentate ; stipules setaceous. Calyx-tube angled ; carpels biaristate — Spring — Sinai.

6. MALVELLA, Jaub. et Spach. Malvella.

Bractlets 3, free. Calyx 5-fid. Styles distinct ; stigmas capitate, club-shaped. Carpels inflated, membranous, indehiscent, somewhat irregularly capitate above a very short torus — Perennial, prostrate herbs, with aspect of Malva.

M. Sherardiana, L. ⊙ .3 to .5, appressed-woolly, grey. Leaves kidney-shaped, obsoletely lobed, crenate. Peduncles usually solitary, filiform, longer than petiole ; bractlets short, setaceous ; calyx-lobes ovate ; petals pink, obovate, entire, twice as long as calyx — Spring and summer — Neglected places and roadsides ; common.

7. ABUTILON, Gærtn. Indian Mallow.

Bracts 0. Calyx 5-fid. Styles united ; stigmas capitate. Cells of ovary 3-9-ovuled. Carpels whorled, generally numerous, 2-valved, naked within, at maturity united or free at base.

1. A. fruticosum, Guill. et Perr. ♄ Appressed-velvety ; branches stiff, erect. Leaves cordate-ovate, crenate-toothed or entire. Peduncles 1-flowered, longer than petiole ; flowers small ; petals twice as long as calyx ; carpels 8-10, velvety, united at base, truncate at apex, angled at outer border, nearly muticous — Early summer — Rocks ; Sinai ; around Dead Sea.

2. A. muticum, Del. ♄ 1 or more, densely woolly, canescent. Leaves large, round-ovate cordate, more or less acuminate, crenate-dentate. Peduncles usually shorter than petiole ; petals twice as long as calyx ; carpels 25-30, hairy, with round, muticous back, *at length separating from axis, and hanging by nerves* — Spring — Around Dead Sea.

8. HIBISCUS, L. Rose-Mallow. Hibiscus. *Khutmî.*

Bractlets numerous, usually narrow. Calyx 5-fid. Branches of style 5, dilated into a capitate stigma. Ovary 5-celled, cells 3-many-ovuled. Capsule membranous, or more or less leathery — Shrubs or herbs.

* *Calyx not inflated. Seeds woolly.*

1. H. ovalifolius, Vahl. ♄ Scabrous with scattered, stellate hairs ; branches wand-like. Leaves small, ovate, obtuse, acutely dentate.

Peduncles in upper axils, longer than petiole ; bractlets setaceous, shorter than calyx ; calyx-lobes triangular, acuminate ; flowers *minute; petals purple*, obovate-oblong, thrice as long as calyx — Rocks ; Sinai.

2. H. Syriacus, L. ♄ Shrubby Althœa. Leaves cuneate-ovate, 3-lobed, dentate. Peduncles shorter than petioles ; bractlets 6-7, linear, as long as calyx ; calyx-lobes triangular-lanceolate ; petals obovate, 3-4 times as long as calyx — Summer — Cultivated, but not found native in Syria.

* * *Calyx inflated. Seeds glabrous, tubercled.*

3. H. trionum, L. ⊙ Bladder Ketmia. .3 to .5, more or less hirsute. Lower leaves round, undivided, the others 3-5-palmately parted into obovate-oblong, obtusely lobulated lobes ; bractlets numerous, setaceous, rough-hairy ; calyx hairy, veiny, membranous, lobes triangular ; petals twice as long as calyx, *yellow with* a purple spot at base — Summer — Fields ; rather common, even to subalpine regions.

Among the cultivated plants of this order are the Cotton plant, Gossypium herbaceum, L., the Okra, Abelmoschus esculentus, L., and the hemplike Okra, Hibiscus cannabinus, L.

ORDER XXII. TILIACEÆ JUSS. (LINDEN FAMILY.)

Trees, shrubs, or herbs, with mucilaginous juice, fibrous bark, 5-fid-calyx, valvate in the bud, petals 5, twisted-inbricated in the bud, anthers two-celled, opening by a double chink — Petals inserted around the base of the torus. Stamens free, or 5-6-adelphous. Ovary free, many celled, the cells 1- many-ovuled. Placentæ central, ovules anatropous. Fruit a drupe or capsule. Seeds usually albuminous, embryo straight.

1. GREWIA, L. GREWIA.

Sepals 5, somewhat leathery. Petals 5, pitted at inner aspect of base. Stamens free. Style awl-shaped ; stigma 2-4-lobed. Fruit a 4-lobed drupe, the pyrenes 1-2-seeded—A small tree, with flowers usually arranged in axillary racemes.

G. populifolia, Vahl. ♄ Branches slender. Leaves petioled, rigid, round to obovate, .02 broad, dentate. Peduncles 1-flowered, shorter than leaf ; sepals linear-lanceolate, puberulent, longer than the linear, bifid petals ; drupe shining — Arabia Petræa.

2. CORCHORUS, L. CORCHORUS. *Melukhîyeh.*

Sepals 5-4. Petals 5-4, naked at base. Stamens free, numerous (or double the number of the petals). Style short ; stigma hollow, crenulate. Capsule siliquose, naked, loculicidal, many-seeded —Herbs with yellow flowers.

1. C. olitorius, L. ⊙ *Melukhîyeh.* .3 to 4, *glabrescent.* Leaves petioled, oblong-ovate, serrate, the lower teeth tipped with *long bristles.* Peduncles, 1-2-flowered ; stamens numerous ; pods *glabrous,* cylindrical, .1 long, 10-angled, .006 broad, 5-valved, with a conical

beak — Spring — Fields and roadsides ; escaped from cultivation. This plant furnishes the valuable fibre known as *Jute*, which is soft, silky, and easily spun. It is used in the manufacture of carpets, and some kinds of cloth, but is not suitable for cordage, owing to its becoming soft in water. It is extensively used in surgery as a cheap drainage material.

2. C. trilocularis, L. ⊙. .2 to .3, *asperulous.* Leaves short-petioled, ovate to oblong, serrate, the lower teeth usually *ciliate.* Peduncles 1-2-flowered ; pods *scabrous*, 3-4-angled, cylindrical, .05 long, .002 broad, 3-valved, obtusely-beaked — Spring — Ghor-et-Safieh.

DIVISION II. DISCIFLORÆ.

Sepals sometimes distinct, imbricated or valvate, at others united into a generally small calyx, with lobes or teeth imbricated, open, or valvate, free from ovary, or adnate to the base of the ovary only. Torus a fleshy, cup-shaped disk, free or connecting the ovary with the calyx, or united with the ovary alone, or rarely disconnected with the ovary, and covering the base of the calyx. Petals generally as many as sepals, or by abortion fewer, inserted on the torus, at the base of the calyx, around the disk. Stamens as many as petals, or double their number, or by abortion fewer, inserted around, or within, or above the disk. Gynœcium of united carpels, divided by septa, with placentæ at central angle of cells, or with separate carpels, generally on the disk, sometimes implanted in it.

ORDER XXIII. **LINEÆ.** (FLAX FAMILY.)

Herbs, sometimes with shrubby base, regular, symmetrical hypogynous flowers, 4-5-*merous throughout, imbricated calyx, and hypogynous convolute petals, the* 4-5 *stamens connate at base, and the capsule with twice as many incomplete cells and seeds as there are styles* — Styles 4-5. Ovules anatropous. Capsule loculicidal. Partition projecting from valve. Albumen scanty.

1. **RADIOLA,** L. RADIOLA.

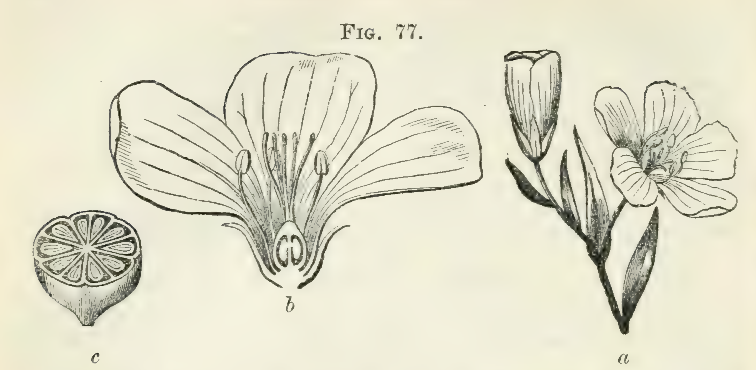
Flowers tetramerous throughout. Capsule 4-celled — A trivial annual herb, with aspect of Alsine, with filiform forked branches, and minute, corymbose, white flowers.

R. linoides, Gmel. ⊙ .02 to .1, glabrous. Leaves ovate, .002 long — September — Plateau between Jebel Sunnîn and Jebel Kenîseh.

2. **LINUM,** L. FLAX. *Kittân. Zîr. Fârq.*

Flowers pentamerous. Capsule 5-celled, cells divided by partitions from the valve almost to the axis — Herbs or shrubs.

Fig. 77.



(*a*) Bud and flower of L. usitatissimum. (*b*) Longitudinal section of flower showing the calyx, the disk, into which the petals and stamens are inserted, the ovary with central placenta, and the 5 styles. (*c*) The capsule divided transversely, showing the 5 cells, each divided by a septum extending from the valve nearly to the axis (by an inaccuracy of the artist represented as actually reaching the axis).

* *Petals yellow.*

† *Petals free.*

1 L. Gallicum, 2 corymbulosum, 3 strictum.

† † *Petals adhering by upper part of claws.*

‡ *Annuals.*

4 L. nodiflorum.

‡ ‡ *Perennial.*

5 L. Balansæ, 6 flavum.

* * *Petals blue or pink, free or somewhat united by claws.*

† *Stigmas filiform-club-shaped.*

‡ *Fruiting pedicels short. Sepals glandular. Claws of petals somewhat united. Annuals.*

7 L. hirsutum, 8 pubescens.

‡ ‡ *Fruiting pedicels rather long. Sepals destitute of glands.*

§ *Annuals.*

9 L. usitatissimum, 10 humile.

§ § *Annuals sometimes becoming perennial.*

11 L. angustifolium.

† † *Stigmas capitate, or oblong-capitate.*

12 L. tenuifolium, 13 carnulosum, 14 Austriacum.

1. L. Gallicum, L. ⊙ .3 to .5, glabrous, loosely corymbose. Leaves linear-lanceolate to linear, scattered. Lower fruiting pedicels as long as calyx or longer ; sepals lanceolate, acuminate, *half* as long as corolla, longer than capsule — Spring — Coast and Lebanon to 1000 m.

2. L. corymbulosum, Rchb. ☉ .3 to .5, *slender, loosely corymbose-paniculate.* Leaves scattered, linear-lanceolate to linear. Lower fruiting pedicels as long as calyx or longer ; sepals lanceolate, tapering, *one-third* as long as corolla, twice as long as capsule — Spring — Mt. Carmel ; middle and subalpine Lebanon. A taller and stouter plant than the last.

3. L. strictum, L. ☉ .3 to .5, glabrous ; stem at first slender, becoming stout and stiff, corymbose. Leaves *crowded,* linear-lanceolate, acute, *very rough.* Flowers .005 long ; fruiting pedicels thickened, *shorter than capsule ;* sepals lanceolate, acuminate, *two-thirds as long as* .005 long *corolla,* twice as long as capsule — Spring — Dry hillsides ; type less common in our district than

Var. **spicatum,** Rchb. Corymbs dense, *spiked.*

4. L. nodiflorum, L. ☉ .3 to .5, glabrous ; stems angled. Leaves *spathulate to oblong* and linear-lanceolate. Branches of dichotomous cyme with *remote, nearly sessile* flowers, .01 long ; sepals *linear,* glandless, half as long as corolla, thrice as long as ovate, acute capsule — Spring — Dry hillsides and fields ; common throughout.

5. L. Balansæ, Boiss. ♃ .2 to .3, glabrous, glaucous ; stems herbaceous, prominently lined above. Leaves *obovate,* 5-7-nerved, the upper oblong, all acute or abruptly acuminate. Branches of cyme loose, few-flowered ; flowers .02 or more long ; sepals lanceolate, acuminate, keeled, with glandular, membranous margin, one-third to one-fourth as long as corolla, in fruit recurved, twice and a half as long as capsule ; petals orange, *with a livid purple throat* — Summer — Damascus table-land ; hills between Aintâb and Nisib.

6. L. flavum, L. ♃ .2 to .3, glabrous; stems herbaceous from a shrubby base, acutely angled above. Leaves *obovate-lanceolate* 2-3-nerved, to lanceolate and linear, acute. Branches of cyme forked, nearly equal ; sepals lanceolate, glandular-margined, acuminate, one-third as long as .03 long, yellow corolla, once and a half as long as capsule — Spring — Fields ; mountains and interior plains. A variable species.

Var. **Orientale,** Boiss. Stems more shrubby at base. Leaves oblong-lanceolate to linear, 1-nerved. Branches of cyme more dense. Petals *orange.* (*L. Orientale, Boiss.*)

Var. **Tauricum.** Leaves linear-oblong obtuse, to linear-lanceolate acute, 1-nerved. Petals *pale yellow* — Hermon (*L. Tauricum, Willd.*)

Var. **Syriacum.** Glaucescent. Leaves linear-lanceolate to linear, 1-nerved. Petals pale yellow (*L. Syriacum, Boiss.*)

Var. **sulphureum.** Shrubby. Cymes depauperated, flowers often solitary. Leaves 1-nerved, the lowest *minute, oblong-spathulate,* mucronate, the rest oblong-linear, stiff, acute. Flowers sulphur-colored to orange (*L. Sulphureum, Boiss. et Hausk.*)

Var. **rigidissimum.** Shrubby, branches rigid. Lower leaves and those of sterile twigs *minute, imbricated, fleshy, oblong-obovate, with white, minutely denticulate* margin, the others linear-oblanceolate — Kapu-Cham-Dagh, and north-eastward (*L. rigidissimum, Post. Trans. Linn. Soc., Lond.,* 1888, *p.* 428.)

7. L. hirsutum, L. ♃ .3 to .5, *woolly.* Leaves lanceolate to linear, rarely glabrescent. Branches of cyme at length spike-like ; sepals ovate-lanceolate, acute, one-third to one-fourth as long as .025 long, *light blue* corolla, about twice as long as capsule — Spring — Gennesaret (Tristram.)

8. L. pubescens, Russ. ⊙ .3 to .5, more or less bristly-hairy ; stems branching from neck. Leaves 3-5-nerved, oblong obtuse to oblong-lanceolate acute, glandular-denticulate. Branches of cyme at length elongated, spike-like ; sepals nerved, linear-lanceolate, one-third as long as .03 long, *pink* corolla, thrice as long as capsule — Spring — Fields ; common throughout in plains and lower mountains.

9. L. usitatissimum, L. Common Flax. *Kittân.* .5 to 1, stems simple or nearly so, erect. Leaves linear-lanceolate. Sepals ovate, acuminate, 3-nerved, one-third as long as .02 long, *deep blue, crenate* petals, *as long as capsule ;* inner margin of septa of capsule not ciliolate — Spring — Cultivated, and escaped from cultivation.

10. L. humile, Mill. ⊙ .2 to .3 ; stem erect. Leaves flat, linear-lanceolate, acute. Sepals ovate, acuminate, 3-nerved, ciliolate, one-third as long as deep blue corolla, *a little shorter than capsule,* one half to one-third as long as deep blue, *entire* petals ; inner margin of septa of capsule ciliate — Spring — Fields ; Hermon to Aintâb, and northward.

11. L. angustifolium, Huds. ⊙ ♃ .3 to .5, ascending from a many-stemmed neck. Leaves *scattered,* linear-lanceolate, acute, 1-nerved. Sepals two-fifths as long as .01 long, blue corolla, *scarcely as long as capsule,* ovate, short-acuminate, 1-nerved, the outer toothed-ciliate—Spring—Fields and dry hills ; common. Varies considerably in length and breadth of leaves, etc.

12. L. tenuifolium, L. ♃ .3 to .5, shrubby at base ; stems erect, rather rigid from a procumbent base. Leaves crowded, *linear-awl-shaped,* keeled, 1-nerved,*margin somewhat revolute.* Sepals 1-nerved, ovate-oblong, long-acuminate, one-third as long as .015 long, *lilac* corolla, scarcely longer than capsule — Summer — Mountains around Aintâb, and northward.

13. L. carnulosum, Boiss. ♃ .04, glabrous, glaucous ; stems *tufted.* Leaves crowded, linear, rather obtuse, .006 to .008 long, *fleshy.* Flowers 1-2 ; fruiting pedicels nodding ; sepals ovate or nearly round, obtuse, muticous, broad margined, 3-5-nerved at base, half as long as the ovate, acutish capsule — Summer — Alpine Lebanon, above Cedars. Perhaps a variety of the following.

14. L. Austriacum, L. ⊙ ♃ .3 to .4, glabrous ; stems erect or ascending. Leaves linear, acute. Branches of cyme raceme-like, fruiting pedicels recurved ; sepals *round-ovate,* somewhat 5-nerved at base, *one-third as long as* .01 *long, light blue petals, less than half as long as the* globular, .01 broad capsule — Spring — Cœlesyria, Haurân, Aintâb, and northward.

ORDER XXIV. **ZYGOPHYLLEÆ.** R. Br. (ZYGOPHYLLUM FAMILY.)

Herbs or shrubs, with stipulate (usually compound) leaves, destitute of glandular dots, with regular flowers, 5

(rarely 4) sepals and petals, imbricated in the bud (rarely convolute,) stamens as many or twice as many as the petals, usually with a scale at base — Lobes of ovary as many as sepals, rarely more; cells 2- ∞ - (rarely 1-) ovuled, sometimes divided by transverse partitions; ovules anatropous, pendulous or ascending. Style 1, from axis (rarely 5,) stigma simple. Fruit a septicidal capsule, composed of carpels which separate at length from the axis. Seeds with or without albumen. Embryo straight, radicle superior.

* *Embryo without albumen.*

† *Fruit separating into indehiscent carpels.*

1. TRIBULUS. Prostrate herbs with pinnate leaves and prickly fruit.

† † *Fruit an inversely pear-shaped, unarmed drupe, with bony endocarp.*

2. NITRARIA. Shrubs with fleshy leaves, growing in salt marshes

* * *Embryo albuminous.*

3. SEETZEENIA. Petals 0. Desert perennial herbs.
4. ZYGOPHYLLUM. Petals 4-5. Stamens with a scale at base. Stipules not spinescent.
5. FAGONIA. Petals 4-5. Filaments naked at base. Stipules spinescent.

1. TRIBULUS, L. Tribulus.

Sepals 5. Petals 5, fugacious. Disk annular. Stamens 10 (rarely 5) inserted at base of disk, shorter than the petals, alternating with them, furnished with a gland at base. Ovary sessile, 5-celled, cells transversely divided. Style 1, stigma 5-rayed. Ovules 1-5, placed one above another in the cells. Fruit composed of bony cells, with a prickly or winged-prickly back — Annual, prostrate, loosely branched herbs, with flowers in the forks of the branches or in the axils, the leaves abruptly pinnate, or (by abortion) imparipinnate.

1. T. bimucronatus, Viv. .3 to .5, appressed-canescent. Petals obovate, somewhat longer than calyx ; stamens 5, rarely 10 ; stigma capitate or ovate, as long as or longer than the style ; carpels appressed-hairy or canescent, *round at back*, rough-warty, with 4 prickles, the lower often reduced to tubercles — Spring — Sinai.

Fig. 78.



Leaf and fruit of T. terrestris.

2. T. terrestris, L. ⊙ .3 to .5, appressed-pubescent or canescent-silky. Petals oblong, somewhat longer than calyx ; stamens 10 ; stigma pyramidal, nearly sessile ; carpels appressed-hairy or canescent, *back more or less keeled and somewhat crested*, with 4 prickles, the lower sometimes abortive — Spring and summer — Fields and roadsides ; common.

T. alatus, Del. ⊙ *Jatha. Dreisi. Kharshûm-en-Naqh.* Appressed canescent. Petals obovate-oblong, as long as or longer than calyx ; stamens 10 ; stigma ovate-capitate, as long as style or shorter ; carpels hairy, with warty, more or less keeled back, *bordered on both sides by a wing cut into triangular spines, and more or less dentate,* narrower than the diameter of the carpel — Spring — Et-Tîh to Sinai and Egyptian desert.

2. NITRARIA, L. Nitraria. *Gharqad.*

Calyx small, 5-fid, persistent, valvate in the bud. Disk inconspicuous. Petals 5, hooded, short-beaked at apex, valvate in the bud, with infolded borders. Stamens 15, inserted at the margin of the disk, naked at base. Ovary silky, oblong-pyramidal, 3-celled, gradually tapering into a short style ; stigmas 3, connivent. Ovules 1 in each cell, suspended by their middle. Fruit a conical drupe, the endocarp a bony, wrinkled, 1-celled pyrene, the apex splitting into 6 awl-shaped teeth. Seed ovoid, acuminate — Shrubs growing in salt marshes, the branches usually spinescent, the new shoots appressed-canescent, the leaves fleshy, alternate or clustered, the stipules indurated, the flowers corymbose-paniculate.

N. tridentata, Desf. ♄. *Gharqad. 'Enab-ed-Dîb. Sahanûn.* 1 to 3, Leaves wedge-shaped, entire, retuse, or 3-5-crenate-dentate at tip. Flowers long-pedicelled — Spring — Around the Dead Sea, and southward to Sinai and Egypt. Supposed by some to be the Lotus of the ancients, by others to be the plant thrown into the bitter waters at Marah. (Ex. xv., 25.)

3. SEETZENIA, R. Br. Seetzenia.

Sepals 5, valvate in bud. Disk small, 5-lobed. Stamens 5, naked at base. Ovary sessile, 5-angled, 5-celled ; ovules solitary, pendulous. Styles 5, free, deflexed. Capsule ovoid, 5-angled, separable into 5 carpels, dehiscent by a ventral suture ; endocarp crustaceous. Seeds oblong, flattened — Perennial herbs, with aspect of Zygophyllum.

S. Orientalis, Dec. ♃ *Habein.* .2 to .3, glabrous ; branches herbaceous, slender, prostrate. Leaflets 3, longer than petiole, .004 to .008 long, apiculate, the terminal larger, obovate, the lateral oblique ; stipules triangular, membranous, ciliate. Peduncles solitary, longer than petiole — Spring — Sinai, and Egyptian desert.

4. ZYGOPHYLLUM, L. Zygophyllum. *Qillâb. 'Illâm.*

Sepals 4-5, persistent or deciduous, imbricated. Petals 4-5, clawed, imbricated. Disk fleshy. Stamens 8-10, inserted at base of disk, furnished with a scale at base. Ovary sessile, angular, 4-5-celled, tapering into a style. Ovules 2-many in each cell, placed one above the other. Fruit angular or winged, indehiscent or separating into five

carpels, or splitting down the middle of the valves — With exception of Z. simplex, perennial herbs, shrubs, or small trees, with solitary, axillary, 1-flowered peduncles, stipulate, fleshy, opposite leaves, composed (in ours) of one pair of leaflets, or simple.

* *Capsule with wings as broad as or broader than the cells.*

1. Z. dumosum, Boiss. ♄ .3 to 1.5, *appressed-canescent;* branches *tortuous, short.* Leaflets terete, oblong-cylindrical nearly as long as petiole. Peduncles slender, axillary, as long as calyx, lengthening in fruit ; sepals *five*, hairy, oblong ; petals *five*, oblong-spathulate, twice and a half as long as calyx ; scales *round-ovate, obtuse, denticulate at apex ;* capsule .01 broad, oblate-spheroidal ; carpels 5, free almost to axis, flattened, wing *somewhat broader* than cell — Spring — Around the Dead Sea, and from borders of Et-Tîh southward to 'Aqaba.

2. Z. eurypterum, Boiss. et Buhse. ♄ .5 to 1.5, branches elongated. Leaves *simple*, *scurfy*, oblong or obovate, tapering into a short petiole. Peduncles somewhat longer than calyx ; sepals and petals *four*, obtuse, the latter twice as long as the former ; scales *fringed ;* capsule .02 to .03 broad, oblate-spheroidal, retuse at base and apex, wings *four times as broad* as cells — Spring — Hamath to Palmyra.

* * *Capsule angled, wingless.*

3. Z. simplex, L. ⊙ *Jarmal. Qurmah. 'Adhir.* .2 to .4, glabrous, *prostrate*, herbaceous, branching from base. Leaves *simple*, sessile, *cylindrical*, .005 to .01 long, fleshy, obtuse. Peduncles as long as calyx ; sepals obovate ; petals spathulate ; scales *biparted ;* capsule .002 broad, wrinkled, top-shaped, deeply parted into 5, flattened carpels — Spring — Sinai.

4. Z. Fabago, L. ♃ .5 to 1, glabrous, *erect*, herbaceous. Leaflets *obovate-oblong*, .03 long, longer than petiole. Peduncles somewhat shorter than calyx ; sepals oblong, .01 long, nearly as long as the wedge-shaped, retuse petals ; scales *fringed*, papillary ; capsule .03 long, *oblong-cylindrical*, acutely 5-angled — Spring and early summer —(Palestine ?) Damascus to Aintâb, and northward and eastward.

5. Z. album, L. ♄ *Khuraisi. Hamd. 'Illam. Botn-el Bahsanân. Bizz Kelbeh. Belbel. Bawâl.* .3 to 1, *cobwebby-canescent ;* branches ascending. Leaflets fleshy, obovate, .004 to .01 long, somewhat shorter than the fleshy, terete petiole. *Peduncles much shorter than calyx* ; sepals ovate-oblong ; petals white, spathulate, a third longer than calyx ; scales ovate-oblong, *entire ;* capsule *spherical-top-shaped*, the upper third of the 5, acute-angled carpels free — Spring — Salt marshes and hot valleys about Dead Sea, and southward to Egypt.

6. T. coccineum, L. ♄ *Qillâb. Ghâsûl. Belbel. Bawâl.* .5 to 1.5, younger shoots canescent, *at length glabrous ;* branches ascending or erect. Leaflets oblong or cylindrical, obtuse, .005 to .01 long, shorter than the fleshy petiole. *Peduncles longer than the flower ;* sepals ovate, hooded ; petals white or *pink*, spathulate, acuminate, nearly twice as long as calyx ; scales ovate, *retuse ;* capsule .008 to .01 long, *cylindrical*, 5-angled, apex broader, truncate — February to April — Around the Dead Sea, and southward to Sinai.

5. FAGONIA, L. Fagonia. *Hhalâweh.*

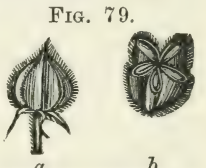
Sepals 5, imbricated, mucronate, deciduous. Petals 5, clawed, imbricated in the bud. Stamens 10, with naked filaments. Ovary sessile, 5-celled ; style awl-shaped, 5-angled ; stigma simple. Ovules 2, side by side at base of cell, attached by ascending funicles. Fruit pyramidal, 5-angled, separating from the axis into 5 carpels dehiscent along their inner angle, 1-seeded. Seeds flattened, oblong, with mucilaginous testa — Perennial, much-branched, often prostrate herbs, with opposite leaves, composed of 1-3, mucronate leaflets ; stipules generally spiny or prickly ; the peduncles inserted between the stipules, solitary, 1-flowered.

* *Young branches somewhat 4-angled, with grooved surface.*

† *Stipules prickly, small, much shorter than leaves.*

1. F. glutinosa, Del. ♃ *Shikâ'ah. Medahîn.* .3 *to* .4, *canescent with viscid, sessile glands, which are often covered with adherent sand ;* prostrate ; internodes long. Petiole shorter than obtuse or somewhat tapering ovate-rhomboid to obovate or oblong .005 to .008 long leaflets. Sepals ovate-oblong, half as long as pale-pink corolla — Spring — Hot valleys about the Dead Sea, and southward to Sinai.

Fig. 79.



(*a*) Capsule of F glutinosa (*b*) Transverse section of the same

Var. **grandiflora,** Boiss. Petals thrice as long as calyx.

2. F. Cretica, L. ♃ .2 to .3, *prostrate*, intricately branched, green. Leaves all of 3, linear-lanceolate, acute leaflets, the lateral as long as petiole, the middle longer. Sepals papillary ; oblong ; petals purple, thrice as long as calyx — Spring — Jebel Usdum to Sinai.

3. F. Kahirina, Boiss. ♃. *Hhalâwat-et-Tîh.* .2 to .3, somewhat glandular, *green ;* branches dichotomous, crowded, spreading. Upper leaves often of 1 leaflet, the others of 3, ovate-oblong to oblong, rather obtuse, about as long as petiole, the terminal usually longer. Sepals glandular, hairy, ovate ; petals pink, 3-5 times as long as calyx — Spring — Ghor-et-Safieh to et-Tîh, and southward to Egypt.

Var. **Sinaica,** Boiss. More glandular ; flowers rather smaller — Sinai.

Var. **minima,** Post. .1 to .2. Leaflets .002 to .004 long. Plant smaller, green — Et-Tîh.

† † *Stipules spiny, as long as or longer than leaves.*

‡ *Flowers minute.*

4. F. Bruguieri, DC. ♃ .2 to .3, pale green, minutely glandular ; branches crowded, procumbent, short ; *internodes short.* Spines *a little longer* than leaves ; leaves short-petioled, the lower with 3, the upper with 1, ovate-oblong, fleshy, mucronate leaflets. Sepals puberulent, *ovate ;* petals pale pink, twice as long as calyx — Spring — Syrian desert from Aleppo southward to Sinai.

5. F. myriacantha, Boiss. ♃ .1 to .2, sparingly glandular, pale green ; branches numerous, *prostrate ; internodes long.* Spines

spreading, sharp, *much longer* than leaves, sometimes .03 long ; leaves nearly sessile, the lower with 3, the upper with 1, oblong-linear to linear, *minute* leaflets. Sepals rather glabrous, lanceolate, *long-acuminate ;* petals pale flesh-colored, twice to twice and a half as long as calyx — Spring — Et-Tîh to Sinai.

6. F. Olivieri, DC. ♃ .2 to .3, green, more or less sprinkled with sessile glands ; branches *erect ;* internodes long. Spines spreading, nearly equalling the leaves ; leaves nearly sessile *all simple*, oblong-linear, rigid, .015 long. Sepals hirsute, oblong-lanceolate ; petals pale flesh colored, twice as long as calyx — Early summer — Cœlesyria, Suq-Wadi-Barada and Dummar to Aleppo, Nisib, and eastward in the Syrian desert.

‡ ‡ *Flowers from* .01 *to* .02 *broad.*

7. F. mollis, Del. ♃ .15 to .3, hispid, yellowish-glandular ; branches erect ; internodes generally short. Spines hispid, longer than petiole, often as long as the leaves ; leaves crowded, with 3, large, fleshy, ovate, obtuse, mucronate leaflets of nearly equal size, much longer than petiole. Sepals ovate, hairy ; petals pink, .01 long, nearly thrice as long as calyx — Spring—Moab to Et-Tîh, Sinai, and Egyptian desert.

Fig. 80.



Leaves and flower of F. mollis.

Var. **grandiflora,** Post. Glabrous or glabrescent. Internodes sometimes elongated. Spines stouter. Petals often .02 long — Judean desert to Wadi 'Arabah (*F. grandiflora, Boiss.*)

* * *Young branches rather terete, striped.*

8. F. Arabica, L. ♃ *'Aqûl-el-Ghazâl. Gemdeh. Hâd. Shuweikah. Shaukân.* .3 to .4, sparingly glandular ; branches erect. Spines longer than leaves, often as long as or longer than internodes ; petiole as long as or longer than the linear, acute, leaflets. Sepals oblong-lanceolate, glandular ; petals pale pink, twice as long as calyx — Spring — Moab to Sinai and Egypt.

Order XXV. GERANIACEÆ. (Geranium Family.)

Herbs, sometimes shrubby below, with tumid joints, palmately veined or lobed, or pinnatisect, stipuled leaves, hypogynous, 5-*merous flowers, imbricated sepals, convolute or imbricated petals, stamens slightly monadelphous or* 5-*adelphous at base, ovary composed of* 5 *carpels, more or less coherent to a prolonged axis, from which they separate at maturity* — Flowers (except in Pelargoniun) nearly or quite regular, petals usually alternating with glands. Stamens 5-15, all fertile, or part sterile. Ovules 2-1, semi-anatropous, pendulous. Carpels splitting along inner face (in Monsonia indehiscent). Seeds with little or no albumen. Cotyledons bent down on the short radicle.

TRIBE I. **BIEBERSTEINEÆ.** Ovary beakless, 5-lobed. Stigmas capitate. Cells 1-ovuled. Albumen little, one-sided.

1. BIEBERSTEINIA. Styles arising from inner side of base of carpels, free.

TRIBE II. **GERANIEÆ.** Ovary with a beak formed by the styles, which are adnate to the axis, and separate from it elastically at maturity, carrying with them the carpel. Cells 2-ovuled. Albumen 0.

* *Flowers regular, or petals sometimes slightly unequal.*

2. MONSONIA. Stamens 15, all fertile, 5-adelphous. Styles curved upward in fruit.
3. GERANIUM. Stamens 10, all fertile. Styles curved upward in fruit.
4. ERODIUM. Stamens 10, of which 5 are sterile. Styles spirally twisted in fruit.

* * *Flowers irregular, the upper sepal spurred.*

5. PELARGONIUM. Stamens 10, of which 7 are fertile. Styles curved upward in fruit.

1. BIEBERSTEINIA, Steph. BIEBERSTEINIA.

Flowers regular. Sepals growing in fruit. Glands 5, fleshy, alternating with petals. Stamens 10, all anther bearing, connate at base in a short ring. Carpels 5, crustaceous, wrinkled, affixed from base to middle to a short gynophore, the ovule pendulous by a short funicle below the apex of the cell, anatropous — Perennial, glandular herbs, with pinnatisect leaves, and panicled or spiked flowers.

B. multifida, DC. ♃ .3 to .4 ; root thick, tuberous, branching; stem thick, grooved, glandular, scaly above base. Leaves lanceolate, hairy, sparingly glandular, 2-3-*pinnatisect* into linear, acute lobules. Petals *cream-colored*, about as long as calyx — Spring — Subalpine regions of Lebanon and Antilebanon ; Plain of Damascus.

2. MONSONIA, L. MONSONIA. *Yahaq.*

Flowers regular. Petals and sepals equal. Glands 5, alternate with petals. Stamens 15, all bearing anthers, connate in a ring at base, united into 5 bundles opposite the petals. Carpels indehiscent ; styles hairy within, rolling up elastically at maturity from base to apex — Annual to perennial herbs, resembling Erodium. Petals undivided, soon deciduous.

M. nivea, Dec. ② ♃ *Yahaq.* .15 to .25 ; stems procumbent, white-hispid. Leaves ovate-oblong, appressed-silvery-canescent, crenate-toothed, plicate above. Sepals obovate-oblong, canescent, scarcely mucronate ; petals flesh-colored, obovate, scarcely longer than calyx ; beak .04 long, 6-8 times as long as capsule — Spring — Et Tîh to Sinai and Egypt.

3. GERANIUM, L. CRANESBILL. GERANIUM. *Jernà. 'Utr.*

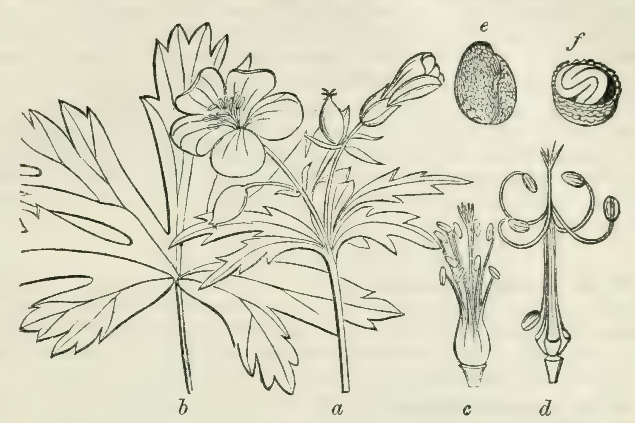
Flowers regular. Sepals equal. Glands 5, alternate with petals. Stamens 10, generally all anther-bearing. Valves of capsule round at base, splitting down the inner side. Styles glabrous within, curving upward in fruit — Annual or perennial herbs, rarely shrubby at base ; peduncles generally 1-flowered.

* *Perennials.*

1. G. subcaulescens, L'herit. ♃ .1 to .2, *rootstock vertical, cylindrical ;* stems few-flowered, sometimes leafless. Leaves round, .02 broad, 5-parted into cuneate, trifid segments, appressed-velvety, of-

ten ash-colored, the radical long-petioled. Sepals short-mucronate ; petals purple, .01 long, obovate, often truncate, twice as long as calyx — Summer — Subalpine and alpine Lebanon.

FIG. 81.



(a) Flowers of a species of Geranium. (b) Leaf of the same. (c) The stamens, 10 in number, 5 long and 5 short, united in a ring below. (d) The fruit at maturity showing 4 of the 5 carpels raised elastically by their curving styles : the fifth is just starting. (e) Seed. (f) The same divided transversely, showing the cotyledons bent over in the shape of an Italic s.

2. G. tuberosum, L. ♃ .1 to .4 ; *roots tuberous ;* stems more or less pubescent or hirsute, erect, 2-3-forked above. Leaves nearly round, 5-9-parted into oblong to lanceolate and linear segments, the radical long-petioled, often .1 broad, the floral sessile. Sepals hairy, ovate, abruptly mucronate ; petals purple, *obcordate*, .015 long, more than twice as long as calyx — Spring — Fields ; common from coast to subalpine regions and interior plains.

3. G. Libanoticum, Boiss. et Bl. ♃ .3 to .5, *rootstock oblique, scaly, the fibres growing from its under surface ;* stems erect, usually less than twice as long as root-leaves, more or less retrorsely hairy, or glabrescent. Stem leaves *two*, the rest all radical, *pentagonal*, .05 to .07 broad, palmately 5-parted, *segments rhomboid*, obtusely dentate and cut. Sepals aristate, 5-nerved ; petals violet, 5-striped from base to middle, obtusely notched .015 to .02 long, twice as long as calyx — Subalpine Lebanon, Cœlesyria, and Nusairy Mountains to Amanus, and northward.

4. G. asphodeloides, Willd. ♃ .3 to .5, *rootstock* as in last ; stem asending or diffuse, *leafy*, branching. Leaves round, the lower 9-10 lobed, .02 to .04 broad, the upper 3-5-parted, lobes *wedge-shaped*, 3-fid. Sepals lanceolate, 5-nerved, aristate ; petals pale violet, obovate, .01 long, twice as long as calyx — April to September — Cassius, and northward.

Var. **hispidum,** Boiss. Stems and branches soft-hispid. Pedicels glandular. Sepals long-hairy — Subalpine Lebanon.

* * *Annuals.*

† *Petals long-clawed. Calyx not angled.*

‡ *Beak of ripe fruit usually about .01 long.*

5. G. pusillum, L. .15 to .25, pubescent, sparingly glandular above. Leaves round, palmately 5-9-parted into cuneiform, incised segments. Sepals oblong, acute, short-mucronate ; petals oblong obcordate, pale violet, somewhat longer than calyx ; valves appressed hairy — Spring — Fields ; Harrân, near Damascus.

6. G. molle, Willd., ⊙ .2 to .4, *downy-villous*, glandular above. Leaves round, palmately 7-9-fid into cuneate, obtusely incised-dentate lobes. Sepals ovate, short-mucronate; petals purple, veined, obcordate, *ciliate above base*, somewhat longer than calyx ; valves *obliquely netted-wrinkled*, glabrous ; seeds smooth — Spring — Fields and waysides ; common everywhere.

‡ ‡ *Beak of ripe fruit about* .02 *long.*

7. G. rotundifolium, L. ⊙ .15 to .4, sparingly *glandular-pubescent.* Leaves kidney-shaped, 7-fid, obtusely incised-dentate. Peduncles short ; sepals hirsute, acute, *short-aristate ;* petals red or white, oblong-cuneate, *entire, glabrous*, as long as calyx to twice as long ; *valves pubescent ; seeds pitted* — Spring — Fields ; everywhere.

8. G. columbinum, L. ⊙ .2 to .4, appressed-hairy. Leaves round, palmately 5-7-parted, segments parted into *linear-lobes*, the uppermost leaves 3-fid. Peduncles *very long ;* sepals broad, ovate, *long-aristate*, appressed-hairy ; petals purple, obcordate, *ciliate above base*, as long as calyx ; valves keeled at back, *rather smooth* — Spring — Beit-Meri.

9. G. dissectum, L. ⊙ .2 to .5 ; stem loosely branched, *retrorsely hispid.* Leaves round, palmately 5-7-parted, *segments cuneate, parted into oblong-linear, obtuse lobes.* Peduncles *short;* sepals flat, hairy, aristate ; petals lilac, obcordate ; valves *villous, furnished with a mucro at the base of the commissure* — Spring — Fields ; common.

† † *Petals long-clawed, purple. Calyx strongly angled.*

10. G. purpureum, Vill. ⊙ .2 to .4, *more or less papillary-pubescent.* Leaves *triangular, ternate or quinate*, leaflets petiolulate, 3-parted into *pinnatifid, incised* segments. Sepals *papillary, oblong-lanceolate, aristate ;* limb of petal as long as claw ; valves densely wrinkled ; seeds finely dotted — Spring — Shady rocks ; common.

11. G. lucidum, L. ⊙ .2 to .3, *glabrous*, fleshy. Leaves *round*, palmately 5-7-fid into cuneate, *obtusely incised and crenate lobes.* Sepals lanceolate, acuminate, glabrous, *transversely wrinkled ;* limb of petal shorter than claw ; valves puberulent at tip, wrinkled lengthwise at back, netted at face ; seeds smooth — Spring — Rocky shady places ; common.

4. ERODIUM, L'her. STORK'S BILL. *Ghazal-dûr-dûr.*

Flowers regular, or petals somewhat unequal. Sepals equal. Glands 5, alternate with petals. Stamens 10, 5 fertile and 5 sterile. Valves of capsule indehiscent ; styles hairy within, twisting spirally at maturity —Annual or perennial, sometimes diœcious herbs, stems often indurated below, peduncles usually umbellate at apex.

* *Beak persistent, bristly within. Valves with 2 pores at tip.*

† *Perennials.*

1 E. trichomanefolium, 2 Amanum, 3 Romanum.

† † *Annuals.*

‡ *Leaves all pinnately or 2-pinnately cut.*

4 E. cicutarium, 5 moschatum, 6 cichonium.

‡ ‡ *Leaves (or at least the lower ones) undivided or lobed.*

7 E. gruinum, 8 botrys, 9 laciniatum, 10 malacoides.

* * *Beak deciduous, plumose. Pore at apex of valves* 0.

† *Perennials.*

11 E. hirtum, 12 Gaillardoti, 13 glaucophyllum, 14 Hussoni.

† † *Monocarpic plants.*

15 E. bryoniæfolium.

1. E. trichomanefolium, L'her. ♃ .1, *densely glandular-hairy*, tufted, stemless. Leaves oblong-lanceolate, 2-pinnatisect into minute, oblong, obtuse lobules. Sepals *short-mucronate ;* petals purple to white, a little longer than calyx ; carpels shaggy, one-fifth as long as .02 long beak — Summer — Alpine Lebanon and Antilebanon.

2. E. Amanum, Boiss. et Kotschy. ♃ *Canescent with glandless wool*, tufted ; rhizome thick, with many branches. Leaves oblong, pinnatipartite into ovate, deeply and obtusely lobed segments. Sepals *abruptly acuminate*, bearded, 5-nerved ; petals * * ; carpels loosely white-villous, one-third as long as beak — Summer — Akmadagh (Amanus).

Var. **glandulosum,** Boiss. Segments of leaves pinnatisect. Peduncles and calyces glandular — Alpine Antilebanon.

3. E. Romanum, L. ♃ .15 to .25 *sparingly appressed-hairy*, stemless ; root fleshy, vertical. Leaves rosetted, oblong to oblanceolate, pinnatipartite into sessile, ovate-oblong, pinnatisect leaflets, lobules small, oblong, acute. Sepals tipped with a bristle ; petals equal, pink, not spotted, 2-3 times as long as calyx ; carpels bearded, one-fifth as long as .04 long beak — Spring — Fields and roadsides ; common in middle mountain zones and interior plains.

4. E. cicutarium, L. ⊙ .2 to .4, caulescent, more or less papillary, often glandular. Leaves oblong, pinnatipartite into ovate, *deeply incised-dentate or dissected* segments. Sepals mucronate with a fine bristle at tip ; petals purple, obovate, unequal, as long as or longer than calyx, often spotted ; beak .05 long, 5-6 times as long as carpels— Spring — Fields ; everywhere.

5. E. moschatum, L. ⊙ *Missaiki* .15 to .4, sparingly glandular-viscid above ; stems ascending, rather fleshy. Leaves pinnatisect into 10-13, *large, ovate, doubly serrate leaflets.* Sepals ending in a stout mucro ; petals pink, unequal, obovate, as long as calyx ; beak .04 long, 6-8 times as long as carpels — Spring — Weedy places ; common everywhere.

6. E. cichonium, L. ⊙ .1 to .4, pubescent-viscid. Leaves ovate, pinnatipartite into ovate, pinnatifid or parted obtusely dentate

segments ; *rachis dentate, winged.* Sepals glandular, long-mucronate; petals purple, obovate, as long as calyx, the upper retuse ; beak .1 to .12 long, 8-10 times as long as carpel — Spring — Weedy places and roadsides ; less common than the others.

Var. **aristatum,** Post. Plant tall. Sepals aristate — Damascus ; Aintâb.

7. E. gruinum, L. ⊙ .2 to .5 ; stem thick, sparingly hirsute. Leaves appressed-papillary, the lowest undivided, cordate-ovate, the others triangular, divided into *three, sessile, acutely dentate leaflets,* the terminal longer, elongated, 3-5-lobed. Sepals .01 long, mucronate to aristate ; petals purple, obovate, longer than sepals ; beak .07 long, *stout,* 6-8 times as long as carpels —Spring —Fields ; common. Flowers showy, .02 broad.

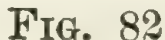
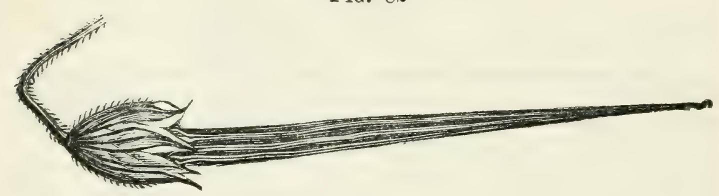


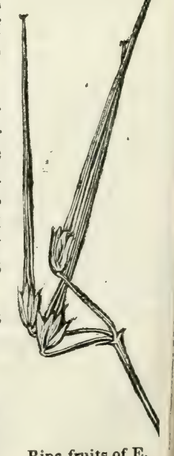
Fig. 82



Ripe fruit of E. gruinum.

8. E. botrys, Cavan. ⊙ .2 to .4 ; stems ascending or erect, retrorsely papillary-hirsute or glabrescent. Leaves hirsute or glabrescent, oblong, the lowermost obtusely sinuate, pinnatifid, the upper bipinnatifid into narrow, acute lobules. Sepals glandular, tapering into a short mucro ; petals purple, oblong, once and a half as long as calyx ; beak .06 to .1 long, slender, 6-8 times as long as carpels — Spring — Beit-meri.

Fig. 83.



Ripe fruits of E. laciniatum

9. E. laciniatum, Cavan. ② .3 to .5, procumbent ; stems and petioles retrorse-hairy, rarely glabrescent, the lowest cordate-ovate, obtusely 3-lobed, the others 1-2-pinnatisect or parted into short, acutish lobules. Sepals glandular-hairy, mucronate ; petals purple, oblong, as long as calyx, or longer ; beak .06 long, slender, 6-8 times as long as appressed-hairy carpels — Spring — Sandy places near coast. Mount Nebo.

Var. **genuinum,** Boiss. Hairy, green ; leaves deeply cut — Common near coast.

Var. **glabrescens,** Post. Glabrous — Beirût.

Var. **pulverulentum,** Boiss. *Ujreiyat-el-Ghazâl. Murghât.* More or less crisp-canescent ; leaves small, sinuate-pinnatilobed or slightly cut ; sepals crisp-hairy, nearly muticous — Sinai to Egypt. Varies in color of leaves from pale green to almost canescent.

10. E. malacoides, L. ⊙ *'Uqeil* .3 to .5, erect or diffuse, clothed with short, spreading hairs ; inflorescence glandular. Leaves appressed-pubescent, *ovate-oblong*, *obscurely lobed*, the lower cordate. Sepals glandular-hairy, mucronate ; petals lilac, obovate, somewhat longer than calyx ; beak .03 to .04 long, slender, 3-4 times as long as carpels — Spring — Fields and weedy places ; common.

11. E. hirtum, Forsk. ♃ *Tummeir. Bislis.* .1 to .25, glabrescent or more or less greyish-hirsute ; *root thick*, *branching*, *furnished with spheroidal to ovoid tubers ;* stems short, procumbent. Leaves *triangular*, *bipinnatisect*, segments decurrent, lobules short, oblong. Sepals glabrescent or grey-hairy, *mucronate ;* petals pink, with a purple spot at base, .008 to .01 long, once and a half as long as calyx ; beak .08 long, *sixteen* times as long as carpels — Spring — Syrian desert to valleys about Dead Sea, et-Tîh, Sinai, and Egypt.

12. E. Gaillardoti, Boiss. ♃ .2 to .3 ; roots vertical, expanded below into ovoid or globular tubers ; stem flexuous, sparingly hairy. Leaves *densely canescent*, *plicate*, *ovate cordate*, *crenate-dentate*, *some undivided*, *others trisect*, *incised ;* stem-leaves smaller, pinnatisect. Sepals *muticous*, glandular-hairy ; petals pink, twice as long as calyx ; beak .07 long, 6 to 8 times as long as hispid carpels — Spring — Plain of Damascus and northward.

13. E. glaucophyllum, Ait. ♃ *Kabshîyah. Ka'kûl. Tummeir. Lisan-el-Hhamal.* .3 to .5, *glaucous ;* root thick ; stems prostrate, much forked. Leaves coriaceous, glabrescent or sparingly puberulent, *oblong*, *crenate or obtusely incised-lobed toward base.* Sepals mucronate, appressed-hairy at nerves ; petals purple, .008 to .01 long, once and a half as long as calyx ; beak .08 long, slender, 10-14 times as long as carpels — Spring — Valleys about Dead Sea, and Judean wilderness to Sinai and Egypt.

14. E. Hussoni, Boiss. ♃ .15 to .4, *scurfy ;* rhizome elongated, scaly ; stems erect, slightly branched. Leaves coriaceous, *ovate-cordate to ovate*, *obscurely lobed*, crenate. Sepals woolly, mucronate ; petals pink, *with a deep purple spot at base*, .015 long, once and a half to twice as long as calyx ; beak .12 long, slender, 12-15 times as long as carpels — Spring — Sinai to Egypt.

15. E. bryoniæfolium, Boiss. ② *Dehâmîn. Murghît.* .1 to .25 ; stems procumbent, retrorse-woolly. Leaves *silky-silvery*, the radical somewhat plicate, cordate-ovate, obtusely crenate, undivided or trilobed or tripartite, the upper lobe often incised ; upper leaves much smallar, more acute, lobed or parted. Sepals mucronate, woolly ; petals pink, somewhat longer than calyx ; beak .06 long, slender, 8-10 times as long as carpels — Spring — Sinai.

5. PELARGONIUM, L'Her. Pelargonium.

Flowers irregular. Sepals 5, connate at base, the posterior produced into a spur adnate to the pedicel. Petals 5, or by abortion fewer, the upper pair dissimilar from the lower. Glands 0. Stamens 10, connate at base, seven fertile, three sterile. Styles at maturity coiled elastically from base to apex — Perennial herbs with a fleshy rootstock.

P. Endlicherianum, Fenzl. ♃ *Sa'udihan Tchichêka* .3 to .5, velvety-pubescent ; stems thick, erect, simple or sparingly branched. Root leaves round-heart-shaped or reniform, crenate, the upper stem leaves 3-5-parted into incised lobes, the middle one rhomboid, trifid. Peduncles long, the terminal one 5-15-flowered. Calyx lobes linear-lanceolate, acute; the upper pair of petals purple, .03 long, thrice as long as calyx, the lower three rudimentary, one-third to one-half as long as calyx, pale, entire or bifid — Summer — Rocky places ; Amanus and northward.

ORDER XXVI. OXALIDEÆ. (WOOD-SORREL FAMILY).

Herbs with sour juice, trefoil leaves, and regular, symmetrical, hypogynous, 5-merous, somewhat monadelphous 10-15-*androus flowers, imbricated calyx, convolute petals,* 5 *distinct styles, and a* 5-*celled, several-seeded capsule* — Anthers with 2 slits. Placenta central.

OXALIS, L. WOOD SORREL. *Hhammâdh.*

Sepals persistent. Stamens 10, the outer shorter than the inner. Capsule loculicidal. Seeds with fleshy aril, separating elastically from tip ; shell crustaceous ; albumen fleshy ; embryo straight — Stipuled herbs.

O. corniculata, L. ♃ .2 to .4 ; root not stoloniferous ; stems diffused, rooting at base. Stipules oblong, adnate to petiole ; leaflets obcordate. Peduncles with 2-3, yellow, .01 broad flowers ; pods .015 long, .003 broad — Spring and summer — Moist places ; common.

ORDER XXVII. RUTACEÆ. (RUE FAMILY).

Plants, usually with glandular-dotted leaves, a heavy odor due to an acrid, aromatic, volatile oil, hermaphrodite 3-5-*merous, hypogynous flowers, stamens as many or twice as many as sepals, (rarely more) ovary with as many carpels as calyx-lobes, raised on a prolongation of the disk* — Leaves stipuled or exstipulate. Calyx imbricated or open in the bud. Cells 2-4-∞-ovuled, ovules anatropous, ascending, inserted on a central placenta. Style 1, arising between the carpels; stigma simple. Cells of capsule splitting down their inner side. sometimes free. Albumen fleshy, embryo curved in axis of albumen, or nearly straight, radicle superior.

* *Flowers irregular. Endocarp separating elastically from sarcocarp.*

1. DICTAMNUS Petals 5. Stamens 10. Flowers panicled, purple, showy.

* * *Flowers regular. Endocarp separable from sarcocarp.*

† *Leaves exstipulate, glandular dotted, strong-scented.*

2. RUTA. Petals 4. Stamens 8. Flowers corymbed, yellow.
3. HAPLOPHYLLUM. Petals 5. Stamens 10. Flowers corymbed, yellow.

† † *Leaves stipuled, not glandular dotted, nor strong-scented.*

4. TETRADICLIS. Petals and stamens 4. Dwarf herbs with minute, spiked flowers.
5. PEGANUM. Petals 5. Stamens 12-15. Flowers .03 broad, white, terminal.

1. DICTAMNUS, L. Dictamnus.

Calyx deciduous, 5-parted. Petals 5, clawed, the upper 4 ascending, the lower declined. Filaments 10, declined, glandular, the anthers nearly globular. Capsule short-stipitate, carpels 5, beaked, 2-3-seeded. Seeds with thin, white, shining shell ; cotyledons fleshy ; radicle minute.

D. fraxinella, Pers. ♃ .5 to 1. Leaflets 5-8 pairs, oblong, serrulate, .04 to .08 long, rachis margined. Petals purple, elliptical-oblong, gradually tapering into a claw — Early summer — Woods ; Cassius and northward.

2. RUTA, L. Rue. *Sadhâb.*

Calyx 4-parted. Petals 4, hooded, dentate or fringed, rarely entire. Stamens 8. Ovary sessile, 4-lobed ; cells 6-8-ovuled. Cells of capsule splitting inwardly at apex — Strong-scented herbs with an indurated base, pinnate leaves, corymbose inflorescence, and bracted, yellow flowers.

R. Chalepensis, L. Aleppo Rue. *Sendeb. Sadhâb. Hharmall.* .5 to .6. Leaves oblong in outline, bipinnatipartite into oblanceolate or obovate leaflets. Bracts *lanceolate ;* calyx-lobes triangular, acute ; petals deeply fringed, abruptly clawed ; capsules acutely lobed — April to August —

Var. **bracteosa,** Boiss. Bracts *cordate-ovate to ovate-lanceolate,* broader than peduncles — Coast and coast range to 1000 m.

Ruta graveolens, L., the officinal Rue is little cultivated or used in Syria.

3. HAPLOPHYLLUM, Juss. Haplophyllum.

Calyx 5-parted. Petals 5, hooded, entire. Stamens 10, the filaments dilated at base, free or somewhat monadelphous. Ovary 5-lobed, depressed. Ovules 2 in each cell (in ours) side by side, or 4. Stigma capitate. Capsule glandular, 5-celled, splitting inwardly at apex, rarely indehiscent. Seeds transversely wrinkled, tubercled — Herbs, usually with a woody root and trunk, erect or divaricate stems, simple or 3-parted leaves, and corymbose, bracted inflorescence.

* *Ovules* 4 *in each cell. Leaves undivided. Filaments free.*

1. H. sylvaticum, Boiss. ♃ .3 to .4, glabrous ; stems simple. Leaves stiff, sessile, tapering at base, oblong-lanceolate, acute. Corymb dense, sometimes puberulent ; pedicels very short ; calyx-lobes glabrous, minute, triangular, acute ; stamens one-third shorter than corolla ; excrescences of glabrous ovary shorter than cell — Summer — Woods ; Mt. Cassius.

* * *Ovules* 2 *in each cell.*

† *Lobes of ovary horned.*

2. H. fruticulosum, Labill. ♃ .2 to .4, pubescent, woody at base ; stems simple or branched. Leaves *simple,* sessile, leathery, the lowest minute, ovate, the others oblong-lanceolate to linear, acute, .005 to .01 long. Corymbs dense ; pedicels shorter than flowers ; ovary white-villous, horns incurved — Spring — Palmyra to Damascus, and Antilebanon and northward.

† † *Lobes of ovary not horned or appendaged.*

‡ *Plants more or less glandular-dotted.*

3. H. villosulum, Boiss. et Haussk. ♃ .3, crisp-puberulent; stems slender, forked-corymbose. The lowest leaves simple, the others trisect into plicate, linear lobes, the upper gradually narrower and shorter. Pedicels longer than calyx; calyx lobes ciliate; petals elliptico-linear — May and June — Vineyards around Aintâb.

4. H. Blanchei, Boiss. ♃ .2 to .3, green, slightly puberulent, beset with small, black glands; stems slender, corymbose, the corymbules head-like. Leaves undivided, linear, with convolute margins, puberulent below. Flowers subsessile; calyx-lobes ciliate; petals oblong, obtuse, reddish — El-Jebel-el-Abiadh (Hamath to Palmyra).

5. H. Buxbaumii, Poir. ♃. .3 to .5, *yellowish green*, appressed-puberulent; stems widely corymbose-branched above. Leaves tapering into a petiole, obovate to spathulate and oblanceolate, often .04 long, all undivided, or the upper unequally parted into 2-3 linear-lanceolate segments. Corymb usually leafy; calyx yellow, glabrous or sparingly bearded; petals oblong, tapering at base, yellow — Spring and summer — Fields; common throughout.

Var. **stenophyllum,** Boiss. Most of the leaves trisect into linear-spathulate divisions.

Var. **corymbulosum,** Boiss. Leaves mostly undivided, narrow. Corymb small. Flowers half as large as in type — Around upper end of Dead Sea.

‡ ‡ *Plants tubercled with prominent or cup-shaped glands.*

6. H. tuberculatum, Forsk. ♃ *Mugennineh. Gergig. Derrâtah. Shagaret-er-Rihh. Rîhheh.* .3 to .4 crisp-pubescent or glabrescent; stems ascending, much forked. *Lower leaves and those of sterile branches obovate or oblong-spathulate, tapering into a petiole, the upper spathulate linear,* obtuse, all from .005 to .012 long, more or less crenate, wavy-margined. Flowers scattered, subsessile, in forked cymes; calyx glabrous; petals oblong, obtuse — Summer — Fields; El-Ghor and Et-Tîh to Sinai and Egypt.

7. H. longifolium, Boiss. ♃. .3 to .5, green, *viscid*, glabrous; stems numerous, stiff. Leaves often .04 long *narrowly linear, sessile,* margin wavy and convolute. Corymbs *minute, dense;* flowers sessile; calyx glabrous; petals somewhat clawed, oblong, rather obtuse — Hot rocks; ravines about Dead Sea.

4. TETRADICLIS, Stev. Tetradiclis.

Calyx 5-parted, persistent. Petals 4, short clawed, persistent. Disk inconspicuous. Stamens 4, with awl-shaped, persistent filaments. Ovary 4-angled, 4-celled, depressed at centre. Placentæ free, filiform, suspended from angle, ascending. Capsule 4-angled, valves grooved, loculicidal; cells divided into 3 compartments by partitions from the endocarp, the lateral 1-seeded, the middle with 4 seeds or less; seeds minute, oblong, with thin testa, little albumen and straight embryo — Small, fleshy herbs with aspect of Peplis.

T. salsa, Stev. ⊙ .1 to .2, branching from neck. Leaves pinnatisect, the floral lobed at base. Flowers in spike-like, scorpioid racemes — Spring —Merj (Damascus).

5. PEGANUM, L. Peganum. *Hharmall.*

Calyx 5-parted, persistent, open in bud. Petals 5, imbricated. Stamens 12-15, inserted with petals at base of short disk, naked, dilated at base. Ovary globular, 3-4-celled. Style triangular. Ovules numerous, suspended at central angle by a short funicle. Capsule 3-valved, loculicidal. Seeds angular, with a spongy shell — Erect herbs or shrubs, with irregularly dissected leaves, bristle-shaped, minute stipules, and terminal white flowers opposite the leaves.

P. Harmala, L. ♃ *Ghalqat-ed-Dîb. Kharjil. Haremlân. Hharmall.* .5 to 1, glabrous ; stems herbaceous, forked, branched, corymbose. Lobes of leaves linear, acute. Petals oblong-elliptical, somewhat shorter than calyx ; capsule erect, depressed at tip — Spring and early summer.

The order **AURANTIACEÆ,** although not indigenous in Western Asia, is represented in cultivation in our district by the following species, all originally from India.

1. Citrus Aurantium, L. Orange. *Burteqân* (a corruption of *Bartughal, Portugal,* perhaps because some prized varieties were introduced from that country).

2. C. Madarensis, L. Mandarîn Orange. *Yusuf Effendi.*

3. C. Bigarada, Duh. Bitter Orange. Seville Orange. *Narinj. Kubbeid.*

4. C. Limonum, Risso. Lemon. *Leimûn hhamidh. Leimûn murâkabi. Leimûn mâlihh.*

5. C. Limonum, Var. **dulcis.** Sweet Lemon. *Leimûn Hhelu.*

6. C. medica, Risso. Citron. *Kibbâd.*

Order XXVIII. SIMARUBEÆ, Rich. (Simaruba Family).

Trees or shrubs, with glandless leaves, diœcious, polygamous, or hermaphrodite flowers, an imbricated, 3-5-lobed or parted calyx, 3-5 petals, an annular or elongated disk, stamens as many as petals or double their number, inserted at base of disk, and a 2-5-celled and lobed ovary — Ovules solitary, anatropous, pendulous beneath the apex of the cell, with a ventral raphe and superior micropyle. Fruit various. Seeds albuminous ; embryo ovoid.

BALANITES, Del. Balanites. *Zaqqûm.*

Flowers hermaphrodite. Sepals 5, deciduous, concave. Petals 5, oblong, imbricated. Disk 10-grooved, hollowed at apex. Stamens 5, filaments naked. Ovary half-immersed in the cavity at the apex of the

disk. Drupe oleaginous ; stone bony, 1-celled, 1-seeded ; cotyledons plano-convex— Small trees, with strong, straight, axillary thorns, alternate, 2-foliolate leaves, and axillary, cymose, green flowers.

B. Aegyptiaca, Del. ♄ *Zaqqûm.* 3 to 5, branches slender. Petioles and petiolules very short. Leaves coriaceous, obovate-elliptical, woolly. Cymes 3-5-flowered, subsessile ; petals linear, glabrous, longer than sepals ; drupe ovoid, .03 long, green, ripe in spring — Winter — Around the Dead Sea.

The Order **MELIACEÆ** (the Mahogany Family) is represented everywhere in Syria by Melia Azedarach, L., the Pride of India, *Zinzilukht* (a corruption of *Azaderacht*). It has become subspontaneous in the neighborhood of human residences and is a favorite shade tree owing to its dense, compound, deep green leaves, and its handsome purple, fragrant blossoms.

ORDER XXIX. CELASTRINEÆ. (STAFF-TREE FAMILY.)

Shrubs with simple leaves, and small, regular (in ours) hermaphrodite flowers, the sepals and petals 4-5, *imbricated in the bud, the perigynous stamens as many as the petals, alternate with them, inserted on the disk. Seeds (in ours) arilled*— Ovary sessile, mostly free at base, 2-5-celled ; ovules (in ours) 2 in a cell, erect, anatropous. Fruit (in ours) a 2-5-celled capsule. Seeds fleshy.

EUONYMUS, Tourn. ♄ SPINDLE TREE.

Calyx flat, covered at base with a broad, fleshy disk. Petals inserted at margin of disk. Stamens inserted above the disk. Capsule 3-5-celled, cells often winged, loculicidal. Seeds usually solitary, albumen fleshy.

E. latifolius, Scop. ♄ 3 to 5, branches glabrous. Leaves oblong-elliptical, acute or acuminate, glabrous, serrulate, often .15 long. Cymes long-peduncled. Capsules winged at angles ; aril covering the whole seed — May — Woods ; Amanus to Akherdagh, and northward.

ORDER XXX. RHAMNEÆ. R. Br. (BUCKTHORN FAMILY.)

Shrubs or small trees, with simple leaves, small, regular, hermaphrodite or polygamous flowers ; a 4-5-fid calyx, with valvate, deciduous lobes, the persistent tube more or less adherent to ovary ; as many petals as calyx-lobes, alternate with them, inserted on the disk or at throat of calyx, or 0 ; *as many stamens as petals, opposite them* — Disk free or lining the calyx-tube, sometimes obsolete. Ovary surrounded by the disk, 2-4-celled. Style erect, stigmas 2-4. Ovules solitary, anatropous, erect. Fruit a drupe, or capsule, or samaroid. Seeds erect, generally albuminous, embryo straight.

1. PALIURUS. Straggling prickly shrubs. Capsule surrounded by a circular wing.
2. ZIZYPHUS. Trees or shrubs. Drupe large, fleshy, edible. Flowers hermaphrodite.
3. RHAMNUS. Shrubs or trees. Drupe small, not edible. Flowers usually polygamous.

1. PALIURUS, Jussieu. Paliurus. *Ssamûr.*

Calyx 5-fid rotate. Petals 5, inserted with the stamens on the disk which lines the calyx-tube. Ovary half immersed in disk, free from calyx, 3-celled. Styles 2-3. Capsule disk-like, red, surrounded by a circular, leathery, wing ; stone woody, 3-celled, 3-seeded. Seeds flattened, erect, with little albumen — A straggling shrub with somewhat 2-ranked, alternate, leathery, shining leaves, and prickly stipules.

P. aculeatus, Lam. ʒ Christ-Thorn. (Authorized version *briers*) *Ssamûr. Farah-Jali* (Turkish) 1 to 3, branches slender, zigzag, alternate. Leaves petioled, obliquely ovate or round, 3-nerved, slightly crenate, the stipular spines very unequal, one straight .01 long, the other curved, much shorter. Fruit .03 broad, wing half as broad as capsule — Spring and summer — Hedges ; common, especially in interior plains.

2. ZIZYPHUS, Juss. Jujube. *'Ennâb.*

Calyx 5-fid, rotate. Petals 5, inserted with the 5 stamens on the disk which lines the calyx-tube. Ovary partly immersed in the disk, connate with it at base, 2-3-celled. Styles 2-3. Drupe fleshy, edible ; stone bony, 1-3-celled, 1-3-seeded. Seeds plano-convex, erect, albumen 0 — Shrubs or trees, with nearly 2-ranked, alternate, leathery leaves, and usually thorny stipules, one shorter, recurved, and flowers in axillary clusters.

1. Z. vulgaris, Lam ʒ Common Jujube. *'Ennâb.* 3 to 6 ; branches zigzag, glabrous ; stipular spines stout, usually confined to leaves subtending branches, (sometimes 0). Leaves .025 to ,05 long, oblong, obtuse, denticulate, glabrous, 3-nerved. *Drupe of the size and shape of an olive,* brown when ripe — Spring and summer — Common.

Var. **inermis**. Spines 0. Leaves large, crenulate — Cultivated and wild.

2. Z. Lotus, L. ʒ 1 to 1.5 ; branches zigzag, whitish, glabrous. Stipular spines slender, leaves .015 long, ovate-oblong, obsoletely crenate, 3-nerved. Drupe nearly globular, a *little larger than a marrowfat pea* — Spring — Coast ; el-Ghor ; Banias.

3. Z. Spina-Christi, L. ʒ Christ-Thorn. *Nabq. Sidr.* 3 to 5, branches white, glabrous, stipules stout ; leaves .02 to .04 long, glabrous or puberulent at nerves of under surface, rounded or subcordate at base, elliptical to ovate or oblong, obsoletely crenate, 3-nerved. Pedicels woolly ; drupe ovate-globular, *as large as a hazel nut, with a rather dry, astringent pulp* — Winter and early spring — In Jordan Valley and oases of Et-Tîh to Egypt.

Var. **inermis,** Post. Destitute of spiny stipules.

3. RHAMNUS, L. Buckthorn. *Nabq.*

Calyx 4-5-fid, with deciduous teeth. Disk thin, lining the calyx-tube. Petals 4-5, inserted at margin of tube, or 0. Stamens 4-5. Style 2-4-fid or undivided. Ovary free, 3-4-celled. Drupe succulent or dry, containing 2-4, cartilaginous pyrenes which split lengthwise — Shrubs or small trees, with diœcious-polygamous, rarely hermaphrodite flowers.

* *Thornless shrubs with persistent, coriaceous leaves, and racemed flowers.*

1. R. Alaternus, L. ♄ *Zifrîn.* 2 to 4, glabrous. Leaves petioled, ovate to elliptical, .04 to .07 long, remotely dentate. Racemes axillary and terminal, short, dense ; calyx-lobes lanceolate, acute ; petals 0 ; drupe black, ovate-globular, as large as a small pea ; seed yellow, with open groove — Spring — Copses and hillsides ; common along coast and in mountains to 1000 m.

* * *Thorny shrubs or small trees, with persistent leaves and clustered flowers.*

† *Shrubs, with short-petioled leaves and alternate branches.*

2. R. punctata, Boiss. ♄ *'Ajram.* 1 to 2, branches stiff intricate. Leaves *entire*, glabrescent above, puberulent and netted-veined below, obovate, oblong, or elliptical, with revolute margins, sometimes pellucid-dotted. Drupe *as large as a small pea ;* groove of seed narrow, *not bifid* — Late spring — Copses and hedges ; common.

Var. **Palæstina.** Leaves *remotely crenate, flat* — Common (*R. Palæstina, Boiss.*)

Var. **angustifolia,** Post. Leaves *linear, and linear-spathulate,* with strongly revolute margins — Mountain above Wadi Qondîl (North of Lattakia plain.)

3. R. Kurdica, Boiss. et Hoh. ♄ 1 to 2.5, branches zigzag. Leaves *pale green*, tomentellous, obovate- or oblong-spathulate, obtuse or acutish, remotely crenulate. Drupe *as large as a marrowfat pea,* mottled, groove of seed *bifid* — May and June — Copses and hedges — Amanus to Aintâb, Marash, and northward.

Var. **obcordata,** Post. Leaves sometimes *obcordate* — Castle of Banias.

Further study may show the last two species to be varieties or R. oleoides, L.

† † *Small trees, with long petioled leaves, the upper opposite.*

4. R. petiolaris, Boiss. ♄ 2 to 4, branches spreading. Leaves a little longer than petiole, glabrous, oblong to elliptical, often .04 long, cuneate, round, or cordate at base, abruptly acuminate, crenate, 3-5-nerved. Drupe as large as a small pea — June — Aintâb to Marash and northward. The fruits, which are used as a dye stuff, under the name of *Persian Seeds*, are exported to Europe.

* * * *Thornless shrubs with deciduous leaves, and clustered flowers.*

5. R. Libanotica, Boiss. ♄ *Tiffâhh-barri.* 2 to 3, procumbent at base. Leaves rounded at base, short-petioled, ovate or oblong, denticulate, yellowish puberulent on both sides, veins pinnate, 12-15 on a side. Drupe black, as large as a currant — Summer — Alpine Lebanon and Antilebanon to Amanus and northward.

ORDER XXXI. AMPELIDEÆ. (VINE FAMILY).

Shrubs, with watery juice, usually climbing by tendrils, with small, regular, hermaphrodite or diœcious flowers, a minute truncated 4-5-toothed calyx, lined by a sometimes urn-shaped disk, 4-5 petals inserted on outer margin of disk, valvate, alternate with calyx-teeth, and stamens as

many as the petals, opposite to them. Berry 2-4 *celled* — Ovary free, with 1-2 anatropous erect ovules in each of the 2-4 cells. Style 1; stigma capitate. Seeds erect, albuminous, with bony testa.

Fig. 84.



(*a*) Branch of the common Vine, Vitis vinifera, showing leaves and tendrils. (*b*) A flower, showing the obsoletely crenate-margined calyx, the petals, united at tip, and falling from disk (*c*) A flower after the falling of the corolla, showing the crenate lobes of the disk between the stamens, and the ovary within.

VITIS, L. Vine. *Karmah. 'Arish.*

Calyx entire or obsoletely toothed. Petals free and soon deciduous, often coherent at apex, and falling together. Berry sometimes by abortion 1-celled, 1-seeded, usually 2-4-seeded.

* *Petals adherent at apex. Tendril bearers.*

1. V. vinifera, L. ♄ Common Grape-Vine. *Karmah. 'Arîsh.* Leaves round-heart-shaped, 5-lobed, coarsely toothed. Flowers panicled; petals 5, obovate, much longer than the obsoletely toothed calyx — Summer — Cultivated everywhere in numerous varieties, but no where strictly spontaneous. Its home is between the southern shores of the Caspian Sea and the Taurus.

* * *Petals free at apex. Tendrils* 0.

2. V. Orientalis, Lam. ♄ Leaves 2-pinnate, the uppermost sometimes 3-foliolate, leaflets round or wedge-shaped at base, ovate-oblong, coarsely serrate or cut. Flowers dichotomously cymose; petals 4, hooded, much longer than the obsoletely 4-lobed calyx; berry as large as a currant, with little juice, black, 4-seeded — Summer — Haurân; Antioch to Marash, and northward.

ORDER XXXII. SAPINDACEÆ. (MAPLE FAMILY).

Trees or shrubs with polygamous, diœcious, or (rarely) hermaphrodite flowers, the 4-5 *sepals imbricated, the petals* 3-5, *or* 0, *the stamens* 5-10, *the ovary* 1-4-*celled, and the cells* 1-2-*ovuled* — Leaves simple or compound. Flowers regular or irregular. Sepals free or more or less connate, often unequal. Disk complete or one sided. Stamens inserted within or on the disk. Ovary central or excentric. Ovules amphitropous or anatropous, with ventral raphe, and inferior micropyle. Style usually 1. Fruit a capsule or key. Seeds usually without albumen, arilled or naked.

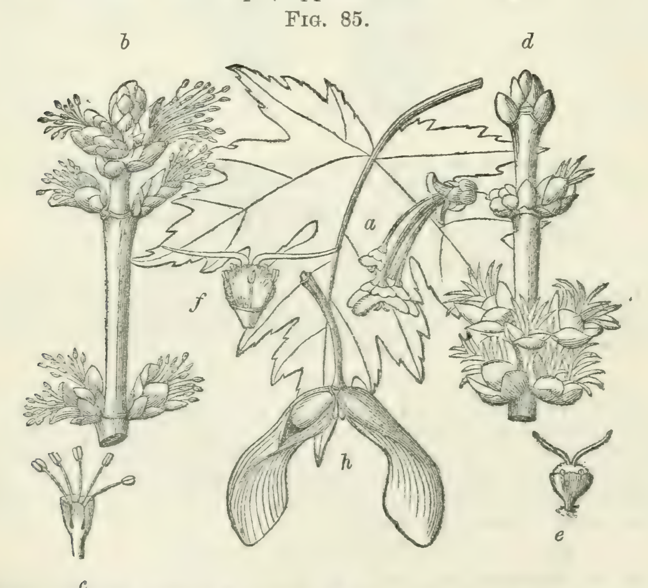
1. **ACER.** **Flowers polygamous. Fruit a double key.**

2. **STAPHYLEA,** **Flowers hermaphrodite. Fruit a membranous, 2-3-celled capsule.**

1. ACER. L. MAPLE. *Qaiqab.*

Calyx 5-parted, deciduous. Petals as many as calyx-lobes or 0. Filaments of male flowers longer than those of the hermaphrodite. Ovary flattened contrary to septum, cells 2-ovuled. Styles 2, filiform. Key with two, long wings. Embryo conduplicate; cotyledons irregularly folded — Trees with simple, opposite leaves.

FIG. 85.



(*a*) Leaf of a species of Maple. (*b*) Branch with clusters of staminate flowers, subtended by imbricated bracts. (*c*) A staminate flower, showing the long filaments. (*d*) A branch with clusters of fertile flowers, subtended by imbricated bracts. (*e*) A single fertile flower showing the anthers. which peer over the edge of the calyx, and the two styles. (*f*) The same enlarged, with the floral envelopes removed to show the short filaments. (*g*) A cluster of immature samaras. (*h*) A mature samara, showing the two wings, and the cells, compressed contrary to the partition.

* *Leaves membranous, appearing with flowers.*

1. A. Hyrcanum, F. & M. ǯ 5 to 6. Leaves heart-shaped or truncate at base, palmately 5-lobed, .06 broad, glaucous below, *bearded at the axils of the nerves, the lobes coarsely serrate or cut.* Wings of fruit erect, nearly connivent, .03 long — Spring — Amanus and northward.

Var. **Reygassei,** Boiss. Leaves truncate at base. Keys smaller, wings somewhat divergent — Subalpine Lebanon.

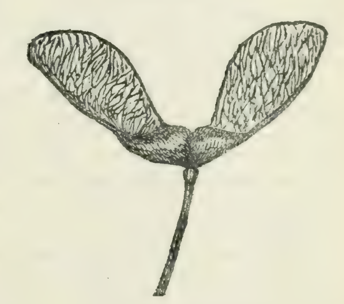
* * *Leaves coriaceous, rather later than flowers.*

2. A. Monspessulanum, L. ǯ 3 to 8. Leaves rounded or somewhat heart-shaped at base, palmately 3-lobed, .04 broad, the *lobes oblong-ovate, obtuse, entire or repand,* the lower surface puberulent, glaucous, the upper glabrous, shining. Keys with erect or divergent wings, scarcely .02 long — Woods ; Lebanon, Antilebanon, Cassius, Amanus, and northward.

Var. **microphyllum,** Boiss. Leaves scarcely .02 broad.

3. A. Syriacum, Boiss. et. Gaill, ǯ 5 to 8. Leaves glabrous, shining above, green on both sides, persistent, *rounded-cuneate at base,* obovate, apex truncate, .05 broad, *with* 3, *short, broad, obtuse or acutish lobes.* Keys with somewhat divergent wings, scarcely .02 long — Spring — Woods ; Palestine ; Lebanon.

FIG. 86.



Key of A. Syriacum.

2. STAPHYLEA, L. BLADDER-NUT.

Sepals 5, deciduous. Petals 5. Ovary 2-3-parted to base, cells many ovuled, styles 2-3, rarely free ; stigmas capitate. Capsule stipitate, bladdery-inflated, 2-3-lobed and celled, the cells splitting at the tip of the ventral suture. Seeds globular, with a bony testa — Shrubs with trefoil or pinnate leaves.

S. pinnata, L. ǯ Leaflets 5-7, remote, oblong-lanceolate, serrulate at base, puberulent at under surface. Racemes terminal, long-peduncled, ovate, pendulous. Lobes of capsule connivent — Spring — Hedges and shady places ; Amanus and northward.

ORDER XXXIII. ANACARDIACEÆ, ENDL. (CASHEW FAMILY.)

Trees or shrubs, with alternate dotless leaves (usually pinnate), a resinous or acrid juice, small, often polygamous regular flowers, a minute, persistent, 3-7-fid calyx, petals as numerous as calyx-lobes, inserted on the calyx, valvate, sometimes 0, *and a* 1*-celled* 1*-ovuled ovary, with* 1 *or more stigmas or styles* — Disk ring-shaped or torus-like. Stamens

as many or twice as many as petals. Ovule pendulous or ascending, with inferior micropyle, and usually dorsal raphe. Fruit free, or surrounded at base by the calyx, usually an indehiscent drupe.

1. RHUS. Petals 5. Juice not terebinthine.
2. PISTACIA. Petals 0. Juice terebinthine.

1. RHUS, L. SUMACH. *Simmâq.*

Flowers hermaphrodite or diœcious-polygamous. Calyx 5-fid. Petals 5, spreading. Stamens 5, inserted under the orbicular disk. Short styles or stigmas 3. Drupe small, dry, flattened, with a 1-seeded bony pip — Shrubs or small trees, with simple, trefoil, or pinnate leaves.

1. R. Cotinus, L. ♄ Smoke Plant. 2 to 4, glabrous. *Leaves simple, obovate, entire,* glaucous beneath. Panicles large, *loose,* compound, terminal, .2 to .4 long, *many of the pedicels abortive, hairy;* flowers hermaphrodite ; drupe obovate, veined, *glabrous* — Summer — Cassius and Amanus to Aintâb, Marash, and northward.

2. R. Coriaria, L. ♄ Sumach. *Simmâq.* 2 to 5, puberulent. Leaves *odd-pinnate,* with 5-7 pairs of leaflets, villous beneath, oblong-lenticular, coarsely serrate. Panicles *dense,* thyrsoid, terminal, .1 to .2 long ; flowers polygamous ; drupe globular-reniform, *covered with acid, glandular wool* — Spring and early summer — Common. The fruit is used to make an acid drink. The fruit, bark, and young leaves are used in tanning and dyeing.

3. R. oxyacanthoides, Dum. ♄ Branches twisted, *thorny,* Leaves glabrous, *ternate,* the petiole a little shorter than the leaflets ; the leaflets sessile, cuneate-obovate, obtusely few-lobed, dentate from middle to apex. Racemes short, terminal ; flowers diœcious ; drupes shining, *glabrous,* globular — Spring — Base of Lebanon near Sidon. Wadi 'Arabah. Sinai.

2. PISTACIA. PISTACHIO. *Fistuq.*

Flowers diœcious, apetalous ; *the staminate* with a 5-fid calyx, and five, short stamens, with large anthers; *the pistillate* with a 3-4-fid calyx. Styles short, trifid. Drupe 1-seeded, with a chartaceous epicarp, and bony pip. Seed compressed —Trees or shrubs with a terebinthine gum, usually pinnate leaves, and axillary racemes or panicles.

1. P. vera, L. ♄ Pistachio. *Fistûq. Qarmîdi-beledi.* 3 to 6. Leaves at first velvety, then glabrous except at margin, odd-pinnate with 1-2 pairs of broad, leathery, .05 to .1 long, ovate, obtuse or mucronulate leaflets, sometimes simple. Fruit .02 long, oblong, apiculate, seed edible — Spring — 'Ain-et-Tîneh (near Damascus). Cultivated everywhere.

2. P. Terebinthus, L. ♄ *Terebinth. Butm.* 4 to 8. Leaves deciduous, odd-pinnate, of 4-6 pairs, with *glabrous,* angled petiole, and nearly glabrous, ovate-oblong to lanceolate, .03 to .06 long, mucronate leaflets, oblique at base. Fruiting panicles straight, stiff, or zigzag ; fruit .003 long, flattened orbicular, apiculate — Spring — Rocky places and hillsides ; merges by imperceptible gradations into

Var. **Palæstina,** Engl. Odd leaflet small, or reduced to an awn or mucro, or 0. Petiole crisp-puberulent — More common in our district than type. (*R. Palæstina, Boiss.*)

3. P. mutica, Fisch. et Mey. ♄ 12. Leaves deciduous, odd-pinnate, with *margined petiole*, and 2-4 pairs of puberulent, oblong to ovate-oblong, .03 to .05 long, obtuse, *muticous* leaflets. Fruiting panicles straight, stiff ; drupe .004 long, obovate, flattened, apiculate — Spring — North of Jerusalem. Probably introduced from Asia Minor, where it is indigenous.

4. P. lentiscus, L. ♄ Mastich. *Mastîk.* 1 to 3 ; shrubby. Leaves *persistent*, abruptly-pinnate, with *winged petiole*, and 3-5-pairs of .02 to .03 long, leathery, oblong-lanceolate to obovate, obtuse, mucronulate leaflets. Fruiting panicles small, stiff ; drupe .003 long, globular-obovate, somewhat flattened, obliquely apiculate —Spring and early summer — Copses and rocky hillsides ; common along coast and lower hills. It furnishes the mastich of commerce,

To this order belongs the Pepper Tree, *Shajaret el Filful*, Schinus molle, L., extensively cultivated as an ornamental tree, also Sch. terebinthifolia, L., a small tree, resembling Pistacia Terebinthus.

ORDER XXXIV. MORINGEÆ, (BÂN FAMILY).

Shrubs or small trees with irregular, hermaphrodite flowers, a 5-parted calyx with imbricated lobes, the fifth posterior, 5 *petals imbricated in the bud, alternate with the calyx lobes, inserted on the tube, perigynous, a disk lining the calyx-tube,* 10 *stamens inserted at margin of disk, perigynous, the upper* 5 *larger, anther bearing, the lower* 5 *filiform, a free, stipitate,* 1-*celled ovary, with* 3, *parietal placentæ, and a cylindrical-prismatic,* 3-6-*angled, beaked,* 1-*celled,* 3-*valved capsule* — Ovules numerous, pendulous, anatropous, with a ventral raphe. Style declined, with truncate apex. Seeds exalbuminous, with straight embryo, and short, superior radicle.

MORINGA, JUSS. MORINGA. *Bân.*

Small trees with the above-characters, odd-bipinnate leaves, destitute of stipules, and broad, axillary panicles.

M. aptera, Gaertn. ♄ 4 to 8, glaucescent. Primary ribs of leaves 3 pairs, rush-like, with remote, petiolulate, oblong, obtuse leaflets. Pods .2 long, with 3, rounded angles and 6 grooves — Spring — Hot valleys about Dead Sea, and southward to Sinai. An aromatic oil is prepared from the seeds.

DIVISION III. CALYCIFLORÆ.

Sepals more or less united. Disk, into which the stamens are inserted, adnate to calyx-tube, free from ovary, or calyx adherent to ovary, bearing the stamens. Petals generally as many as sepals, or by abortion fewer, inserted at apex of calyx-tube or the disk lining it, sometimes 0. Stamens various, inserted at the margin or the inner face of the disk. Ovary united, or separating into carpels, during flowering usually inferior, or included in calyx-tube.

Sect. I. Polypetalæ. Petals nearly or quite free.

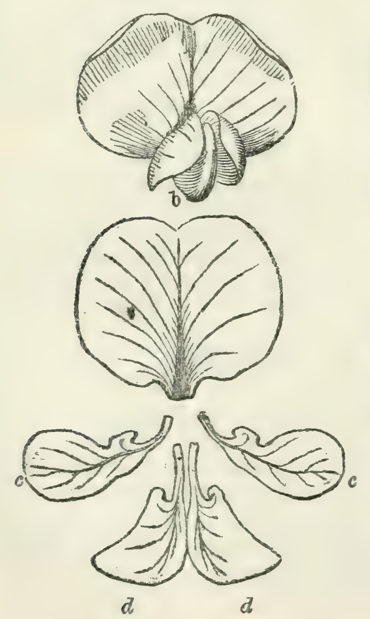
ORDER XXXV. **LEGUMINOSÆ.** (PULSE FAMILY.)

Trees, shrubs or herbs, with papilionaceous or regular flowers, 10 *(rarely* 5-∞ *) stamens, monadelphous, diadelphous, or rarely distinct, and a single, simple, free pistil becoming a legume. Albumen* 0. *Leaves alternate, stipuled, usually compound*— Calyx 5-toothed, the fifth tooth below, or bilabiate, rarely parted to disk. Petals perigynous, rarely connate and adherent to stamens, in the irregular flowers 5, imbricated, in the regular valvate. Stamens hypogynous, or inserted at margin of disk, adnate to base of calyx. Placenta along dorsal suture of the pod. Ovules generally numerous, rarely solitary, amphitropous or anatropous. Legume sometimes nearly two-celled by introflexion of suture, or many-celled by transverse partitions.

SUBORDER I. **PAPILIONACEÆ.**

Corolla papilionaceous, calyx united beyond the disk. Petals imbricated, the uppermost exterior. Radicle inflexed, accumbent on the cotyledons, or (in Cicer) straight, short.

FIG. 87.





(*a*) A papilionaceous corolla. (*b*) The standard. (*c c*) The wings. (*d d*) The keel. (*e*) A group of diadelphous stamens, consisting of nine in one bundle and one alone. (*f*) A monadelphous group of ten stamens.

TRIBE I. **PODALYRIEÆ.** Stamens free. Pod not jointed. Cotyledons leafy — Herbs or shrubs with simple or digitate leaves.

1. ANAGYRIS. Wings longer than standard, shorter than keel.

TRIBE II. **GENISTEÆ.** Stamens monadelphous, the alternate anthers short, versatile, the others longer, fixed by their base. Wings of corolla wrinkled-folded at their upper margin. Pod not jointed, rarely indehiscent. Cotyledons leafy — Shrubs, rarely herbs, with simple or digitate leaves, and entire leaflets.

* *Staminal tube split along its upper surface. Seeds not caruncled.*

† *The 4 upper calyx-lobes connate in pairs, the lowest lobe narrower.*

2. LOTONONIS. Thornless desert shrubs, flowers cream-colored, pods oblong, flattened.

† † *Calyx-lobes nearly equal, or the upper 2 forming one lip, the lower 3 another.*

3. CROTALARIA. Thornless, low shrubs, with yellow flowers, and inflated pod.

* * *Staminal tube closed. Seeds not caruncled.*

† *Calyx-lobes or lips much longer than tube.*

4. LUPINUS. Annuals, with digitate leaves, and large, blue, white, or yellowish flowers.
5. ARGYROLOBIUM. Thornless shrubs, with trefoil leaves, and small, yellow flowers.

† † *Calyx lobes or teeth generally shorter than tube.*

6. ADENOCARPUS. Thornless shrubs, with small, yellow flowers, and flattened pods.
7. CALYCOTOME. Thorny shrubs, with showy, yellow flowers, and quadrangular pods.
8. GENISTA. Thorny or thornless, leafy shrubs, with yellow flowers.
9. RETAMA. Almost leafless, unarmed, desert shrubs, with white flowers.
10. GONOCYTISUS. Tall, unarmed shrubs, with yellow flowers, and rhomboidal pods.
11. SPARTIUM. Almost leafless, unarmed shrubs, with rush-like branches, and showy, yellow flowers.

* * * *Staminal tube closed. Seeds caruncled.*

12. CYTISUS. Shrubs (ours unarmed), with digitate-trefoil or simple leaves.

TRIBE III. **TRIFOLIEÆ.** Stamens diadelphous, rarely monadelphous, the filaments usually dilated at apex, and the anthers (except in Ononis) alike. Wings not plicate. Pod not jointed, bivalved, rarely indehiscent. Cotyledons leafy — Herbs, rarely shrubs, with pinnate, trefoil, digitate, or simple leaves, the veinlets of the leaflets ending in teeth.

13. ONONIS. Pods inflated, oblong, ovate, or linear, beakless.
14. TRIGONELLA. Pods not inflated, ovate, lanceolate, oblong, or linear, beaked.
15. MEDICAGO. Pods falciform, or spirally coiled, not beaked.
16. MELILOTUS. Pods small, globular or ovate, not included in calyx.
17. TRIFOLIUM. Pods small, oblong, included in marcescent calyx and corolla.

TRIBE IV. **LOTEÆ.** Stamens diadelphous, rarely monadelphous, the alternate filaments or all dilated at apex, the anthers alike. Wings not plicate. Pod not jointed, indehiscent or bivalved. Cotyledons leafy — Herbs or shrubs with trefoil, pinnate, or digitate leaves, and entire leaflets.

* *Pod indehiscent, or at last 2-valved.*

18. ANTHYLLIS. Heads terminal. Calyx inflated in fruit. Pods ovate, 1-celled.
19. PHYSANTHYLLIS. Heads axillary. Calyx inflated in fruit. Pods 2-celled.
20. HYMENOCARPUS. Lower leaves trefoil, upper pinnate. Pod orbicular-circinnate.
21. SECURIGERA. Leaves all pinnate. Pod linear, margined, constricted between seeds.

* * *Pod 2-valved.*

22. CYTISOPSIS. Leaves digitate, 5-7-parted. Pod woody. A small, silky shrub.
23. DORYCNIUM. Leaf pinnate, lower leaflets stipule-like. Keel beakless. Pod wingless.
24. LOTUS. Lower leaflets of pinnate leaf stipule-like. Keel beaked. Pod wingless.
25. TETRAGONOLOBUS. Lower leaflets of pinnate leaf stipule-like. Pod 4-winged.

TRIBE V. **GALEGEÆ.** Stamens diadelphous, rarely monadelphous; filaments filiform at apex. Pod not jointed, indehiscent or bivalved. Cotyledons leafy — Herbs or shrubs with pinnately 3-∞, usually entire leaflets, rarely simple, the petiole not ending in a tendril.

* *Pod small, generally 1-seeded, indehiscent. Glandular-dotted shrubs.*

26. PSORALEA. Leaves trefoil. Flowers racemed or capitate.

*** Pod coriaceous or membranous, 2-valved, transversely partitioned, ∞-ovuled.*

27. INDIGOFERA. Leaves pinnate or digitate, or simple. Flowers in axillary racemes.

**** Pod linear or terete, coriaceous, 2-valved, 2-∞-seeded, not partitioned.*

28. GALEGA. Pod nearly terete, striate lengthwise. Seeds transversely oblong..
29. TEPHROSIA. Pod flattened, linear or ovate. Seeds flattened.

***** Pod large, inflated, chartaceous, indehiscent, or 2-valved at tip.*

30. COLUTEA. Shrubs, with showy, yellow flowers, and pinnate leaves.

****** Pod more or less divided lengthwise by infolding of sutures.*

31. ASTRAGALUS. Pod more or less inflated, linear, oblong, ovate, triangular, or globular.
32. BISERRULA. Sutures in middle of face of sinuate-dentate, flattened pod.

******* Pod not divided lengthwise, oblong or linear. Shrubs with sweet roots.*

33. GLYCYRRHIZA. Flowers blue or violet. Keel of 2 petals. Pods indehiscent or nearly so.
34. GLYCYRRHIZOPSIS. Flowers yellow. Keel united. Pods dehiscent.

TRIBE VI. **CORONILLEÆ.** Stamens diadelphous, the alternate filaments or all dilated at apex, anthers alike. Wings not plicate. Pod terete, rarely compressed, divided into 1-seeded, closed, indehiscent joints, generally separating at maturity — Herbs or small shrubs, with pinnate, rarely simple leaves.

35. SCORPIURUS. Leaves simple. Pods scorpioid, longitudinally grooved and ribbed.
36. HAMMATOLOBIUM. Leaves 5-lobed, digitate. Pod necklace-form.
37. ORNITHOPUS. Leaves pinnate. Pods necklace-form.
38. CORONILLA. Leaves pinnate. Pod cylindrical, 4-angled. Joints oblong.
39. HIPPOCREPIS. Leaves pinnate. Pod separating into horse-shoe-shaped joints.

TRIBE VII. **HEDYSAREÆ.** Stamens diadelphous or monadelphous, the stamen corresponding to the standard, free at base, often connate at the middle with the others; filaments generally filiform to apex; anthers alike. Wings short, rarely equalling keel. Pod generally flattened, rarely terete, jointed, joints 1-2-seeded — Herbs or shrubs with pinnate or rarely simple leaves, entire leaflets, and axillary, racemed, or spiked peduncles.

40. HEDYSARUM. Both sutures of pod crenate; joints at maturity 2-∞.
41. ONOBRYCHIS. Pod not jointed, orbicular or circinnate, pitted, margin crested.
42. ALHAGI. Pod irregularly constricted, moniliform, not jointed.

TRIBE VIII. **VICIEÆ.** Stamens diadelphous, anthers versatile. Pod not jointed, 2-valved. Cotyledons thick, not changed in vegetation, remaining under the ground. Low or climbing herbs, leaves abruptly pinnate, rarely odd-pinnate, or leaf-like petioles, leaflets without stipels.

43. CICER. Wings free. Style filiform, beardless. Stigma terminal. Pod inflated.
44. VICIA. Wings adherent to keel. Style bearded near or under tip, or glabrous. Stigma terminal.
45. ERVUM. Wings adherent to keel. Style bearded above, glabrous below.
46. LATHYRUS. Style slightly twisted, broad at tip. Petiole ending in a tendril or awn.
47. OROBUS. Style not twisted. Petiole ending in an awn or leaflet.
48. PISUM. Style keeled, grooved below, bearded above. Petiole cirrhose or horned.

TRIBE IX. **PHASEOLEÆ.** Stamens diadelphous or nearly monadelphous, anthers versatile, or rarely the alternate ones longer and fixed at base. Pod not jointed, bivalved. Cotyledons thick, generally rising above the ground during germination. First leaves opposite — Twining herbs, rarely erect or shrubby, leaves pinnately trifoliolate, leaflets entire or lobed, generally stipellate.

49. VIGNA. Pod linear, straight, partitioned between seeds. Flowers clustered on axillary peduncles.
50. DOLICHOS. Pod falchion-shaped, not filled up between seeds. Flowers racemed.
51. RHYNCHOSIA. Pod flattened, linear, not partitioned. Flowers not racemed in axils.

SUBORDER II. **CÆSALPINEÆ.**

Flowers irregular, but not papilionaceous. Calyx parted to disk. Petals imbricated, the uppermost the inmost. Radicle superior, straight. Stamens usually free.

TRIBE X. **CASSIEÆ.** Leaves abruptly or odd-pinnate. Petals generally 5, rarely 0. Anthers fixed at base, rarely versatile. Ovary or its pedicle free at the bottom of calyx.

52. CASSIA. Shrubs. Flowers hermaphrodite, yellow, showy. Anthers fixed by base.

53. CERATONIA. Trees. Flowers diœcious or polygamous, anthers versatile. Pods (in ours) partitioned by a sweet pulp.

TRIBE XI. **BAUHINEÆ.** Leaves simple, entire Petals 5, pseudo-papilionaceous. The standard, however, under the other petals. Anthers versatile. Ovary or its stalk free at bottom of calyx.

54. CERCIS. Trees, with small racemes of pink flowers on the old branches.

SUBORDER III. **MIMOSEÆ.**

Flowers regular, small. Petals valvate, generally connate below middle. Radicle straight.

TRIBE XII. **ADENANTHEREÆ.** Flowers 5-merous. Calyx valvate. Stamens generally double the number of the petals, free, anthers crowned with a deciduous gland. Pollen-grains numerous, distinct.

55. PROSOPIS. Low shrubs with 2-pinnate leaves, and thick, spongy pod.

TRIBE XIII. **ACACIEÆ.** Flowers generally 4-5-merous. Calyx valvate. Stamens indefinite, free, or the innermost irregularly short-connate. Pollen grains in 2-6 masses, aggregated in 1 cell.

56. ACACIA. Shrubs or trees with 2-pinnate leaves.

1. **ANAGYRIS,** L. ANAGYRIS. *Jarrûd.*

Calyx campanulate, nearly equally 5-toothed. Wings longer than standard, and shorter than the 2-petaled keel. Pod stipitate, flat, many-seeded, divided within by cellular partitions —Shrub with trefoil leaves, stipules united opposite the leaves.

A. fœtida, L. ♄ *Jarrûd.* 1 to 2. Leaflets elliptical to elliptical-lanceolate, rather obtuse, entire, mucronulate. Flowers in short racemes on the lateral branches ; standard black-spotted ; pod curved ; seeds violet — Spring — Rocky places, coast and interior ; common.

2. **LOTONONIS,** DC. LOTONONIS.

Calyx lobes 4, the upper pair connate, narrower than the lower. Staminal tube cleft above. Pod straight or oblique. Seeds caruncled — Herbs or shrubs with digitate, trefoil leaves, and aspect of Argyrolobium.

L. dichotoma, Del. ⊙ *Hhurbut.* .1 to .2, woolly ; stems slender, prostrate, diffuse, forked. Leaflets cuneate-obovate, obtuse, .004 to .005 long. Flowers minute ; keel obtuse, longer than standard, once and a half as long as calyx ; pod oblong, somewhat club-shaped, .005 long, longer than calyx, 6-10 seeded — Spring — Shores of Dead Sea and southward to Sinai and Egypt.

Var. **Persica,** Post. Pods 4-5-seeded — Sinai. (*L. Persica, Jaub. and Sp.*)

3. CROTALARIA, L. Rattlebox.

Lobes of calyx free, rarely somewhat bilabiate. Stamens connate in a short sheath, split above. Pod turgid, generally many-seeded — Shrubs with simple, exstipulate leaves.

C. Ægyptiaca, Benth. ♄ *Natash.* Branches erect, glabrous or appressed-canescent, at length spinescent. Leaves caducous, small, ovate, canescent. Flowers minute, racemed; pod ovoid, twice to thrice as long as calyx, glabrous — February and March — Sinai.

Fig. 88.



Pod of C. Ægyptiaca.

4. LUPINUS, L. Lupine. *Turmus.*

Calyx deeply 2-lipped, often bracteolate. Wings usually connate at apex. Stamens all connate in a closed tube. Pod more or less flattened, divided by transverse partitions, many-seeded. Cotyledons thick, green — Annual herbs with digitate leaves.

* *Seeds rough tubercled.*

1. L. pilosus, L. ⊙ *Fûl-barri.* .5, hirsute. Leaflets obovate to oblong. Raceme *short*, whorled; bracts *lanceolate;* pedicels shorter than calyx; keel boat-shaped; pod hirsute, .02 broad, 3-4-seeded — Spring — Common along coast and interior. Flowers *deep blue.*

2. L. Palæstinus, Boiss, ⊙ *Fûl-barri. Turmus* .5 or more, hispid. Leaflets obovate to linear. Raceme *remotely whorled;* bracts, *linear*, soon deciduous; *pedicels scarcely shorter than calyx;* keel curved beneath at an obtuse right angle; pod .02 broad, very hirsute, 3-4-seeded — Spring — Southern Palestine and adjacent desert. Flowers *yellow tinged with blue.*

* * *Seeds smooth.*

3. L. hirsutus, L. ⊙ .5, covered with spreading, rusty hairs. Leaflets *obovate-spathulate*, to oblong-spathulate, hirsute on both sides. Raceme ovate, obscurely whorled; bracts *awl-shaped; lower lip of calyx trifid;* blue corolla twice as long as calyx; pod rusty-hirsute, 3-5-seeded; seeds greyish brown — Spring — Along coast.

Var. **micranthus,** Boiss. Flowers half as large as in type. Pod 2-3-seeded. Seeds spotted — Antilebanon near Rasheiyah.

4. L. angustifolius, L. ⊙ *Turmus-esh-Sheitân.* .3 to .4, appressed-pubescent. Leaflets *linear-spathulate.* Raceme rather dense; flowers short-pedicelled, *alternate;* bracts *lanceolate*, deciduous; lower lip of calyx 2-3-*denticulate;* corolla blue; pods .06 long, .008 broad, 3-6-seeded; seeds ovate, grey, mottled with white spots and irregular yellowish lines — Spring — Coast and mountains to 1000 m.

5. L. reticulatus, Desv. ⊙ Appressed-pubescent. Leaflets *linear*, grooved. Raceme rather loose; flowers short-pedicelled, alternate; bracts lanceolate, deciduous; lower lip of calyx *nearly entire;* corolla pale blue; pods .06 long, .008 broad; seeds ovate-globular, white, *black-netted*, with deeper colored, black-dotted spots.

Var. **Philistæus,** Boiss. Racemes few-flowered, over-topping the leaves ; flowers smaller — Spring — Philistia.

6. L. Termis, Forsk. ⊙ Termis. *Turmus.* .5 to .8, silky-villous. Leaflets obovate-oblong. Raceme elongated, loose ; flowers alternate, white, bluish at apex ; bracts oblong, deciduous ; upper lip of calyx *entire, lower obsoletely 3-denticulate or entire ;* pods .1 long, .02 broad ; seeds greenish-white — Spring — Fields ; cultivated and escaped from cultivation.

7. L. luteus, L., with yellow flowers, has been found in fields near Hhaifa by Barbey. Doubtfully spontaneous.

5. ARGYROLOBIUM, Eckl et Zeyh. *Argyrolobium.*

Calyx deeply 2-parted, the upper lip 2-parted, lower 3-dentate or cut. All the stamens connate in a closed tube. Pod more or less divided between the seeds, glabrous. Seeds not caruncled — Small, silvery-silky shrubs, with digitate, trefoil leaves.

* *Racemes terminal.*

1. A. crotalarioides, Jaub. et Spach. ♄ .3 to .4 ; branches *erect, slender.* Leaflets oblong to linear, acute, folded lengthwise. Flowers .006 long, sulphur-coloured, *arranged in long, terminal, loose racemes ;* pods .01 to .03 long, 1-6-seeded — Summer — Chalky hills ; Cœlesyria, Antilebanon, Aleppo, Aintâb, and north-eastward.

* * *Flowers solitary, opposite the leaves.*

2. A. uniflorum, Dec. ♄ Branches *rigid,* .1 to .15 long, *spreading.* Leaflets oblong to oblong-linear, acute. Flowers .004 long ; pod linear, 6-10-seeded — Spring — Deserts of Sinai and et-Tîh. Lebanon?

6. ADENOCARPUS, D.C. Adenocarpus. *Zûfa.*

Calyx bilabiate, the upper lip bipartite, the lower trifid. All the stamens united in a closed tube. Pod linear, glandular-muricate, bivalved. Seeds not caruncled — Shrubs with digitate, trefoil leaves, and yellow flowers.

A. divaricatus, L'her ♄ .15 to .4, branches divergent, pubescent. Leaflets of lower leaves obovate, of the upper obovate-oblong to oblong, all pubescent. Calyx pubescent, and often beset with stipitate glands, lower lip longer, its intermediate division longer than the lateral ; standard hairy — Summer —



Fig. 89.



Pod of A. divaricatus, var. Græcus

Var. **Græcus,** Boiss. Branches loosely villous, white. Leaflets flat, hirsute. Calyx sometimes villous-glandular — Higher mountains of Galilee, to subalpine Lebanon, Amanus, and northward.

Var **Bivonæ,** Boiss. Glabrescent, except stipitate-glandular calyx and pods — Subalpine Lebanon and Amanus.

7. CALYCOTOME, Link. CALYCOTOME. *Qundaul.*

Calyx membranous, truncate, obsoletely denticulate. Claws of petals free. All the stamens connate in a closed tube. Pod bivalved, the upper suture thickened or 2-winged. Seeds not caruncled — Shrubs with forked, stiff branches, spinescent twigs, and digitate, trefoil leaves.

C. villosa, Vahl. ♄ 1 to 2, branches striate. Leaflets obovate-cuneate, .01 long, somewhat silky below. Flowers pedicelled, crowded at the upper nodes ; calyx densely villous ; pods somewhat 4-angled, the upper suture much broader than the lower, woolly-hirsute — Winter and early spring — Roadsides and rocky places ; common.

8. GENISTA, L. WOAD-WAXEN. WHIN.

Calyx bilabiate, the upper lip generally bipartite, the lower trifid. Keel often deflexed. Claws of lower petals often adnate to stamen tube. Stamens all connate in a closed tube, anthers glabrous. Pod more or less flattened, rhombic, ovate, or linear, bivalved. Seeds not caruncled — Thornless or spiny shrubs, with simple or digitate-trefoil leaves, and yellow flowers.

* *Pod ovate or rhomboid, obliquely beaked,* 1-2-*seeded.*

† *Flowering branches terminal, spinescent.*

1. G. acanthoclada, D.C. ♄ .5 to 1, appressed-hairy ; twigs straight, opposite, terete, striate. Leaves nearly sessile, *trefoil ;* leaflets linear, folded lengthwise. Flowers nearly opposite ; pods ovate-rhomboid — Summer — Nusairy Mountains to Cassius, and northward.

2. G. sphacelata, Dec. ♄ Sparingly soft-hairy ; branches alternate, curved, terete, striate. Leaves *simple,* linear-spathulate to oblong-spathulate, *the upper changed into small, ovate, black scales.* Flowers alternate, forming loose racemes ; pods ovate — Summer — Hills of Central Palestine, and along Phœnician coast.

† † *Axillary branches sterile, spinescent. Racemes terminal, prickly at apex.*

3. G. Anatolica, Boiss. ♄ 1.5 to .2 crisp-hairy and tomentellous ; branches decumbent. Leaves *simple,* oblong to linear-spathulate. Racemes short, terminal, with prickly tip. Pods .008 long — June —

Var. **Cassia,** Boiss. Crisp-hairy, not tomentellous — Shady places ; Cassius and Amanus.

* * *Pods linear or oblanceolate, torulose, usually several-seeded.*

† *Corolla marcescent, silky, the standard and keel not deflexed. Unarmed shrubs.*

4. G. albida, Willd. ♄ .2 to .3, appressed-puberulent, prostrate, branches ascending. Leaves oblong-lenticular, the floral obovate-spathulate. Flowers axillary, solitary or twin, forming short, terminal racemes. Pods .02 long, oblanceolate, acuminate — June — Amanus and northward ; Gilead and Haurân.

† † *Corolla glabrous, deciduous. Keel deflexed. Unarmed shrubs.*

5. G. patula, M.B. ♄ .3 to .5, appressed-puberulent ; branches erect. Leaves *linear-lanceolate to linear, acute, mucronate.* Racemes sin-

gle or panicled. Pods glabrous, oblong-linear, .025 long, .003 broad — June — Cœlesyria.

Var. **Antiochia,** Boiss. Leaves linear, .01 long. Pod somewhat torulose — Rocks ; Antioch.

6. G. Libanotica, Boiss. ♄ .1 to .2, tufted, ; branches *woody*, prostrate; twigs short, rigid, erect, striate. Leaves *oblong*, *obtuse*, appressed-hairy. Flowers 1-4 in a short terminal raceme ; young pod appressed-hairy — Summer — Subalpine Lebanon and Antilebanon, and Cœlesyria ; Akherdagh.

9. RETAMA, Boiss. JUNIPER. *Retem.*

Calyx spathe-like. Claws of petals adnate to staminal tube. All the stamens connate in a closed tube. Pod inflated, spherical or ovate, 1-seeded, nearly indehiscent. Seeds not caruncled — Glabrescent shrubs, with branches like those of an Ephedra, sparingly leafy or leafless.

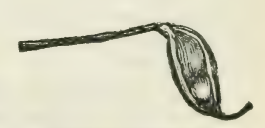
R. Rœtam, Forsk. ♄ Juniper Bush of A. V. *Retem.* 1 to 3, appressed-puberulent, erect, densely branched. Leaves simple, linear, .005 long. Flowers .01 long, 1-5 in subsessile clusters along the twigs. Pods .01 long, obliquely ovate, inflated, abruptly acuminate-beaked — Early spring — Sandy places ; Gilead ; Jordan Valley, and the deserts southward to Egypt. Said to be found also along the Philistine and Phœnician coast.

10. GONOCYTISUS, Spach. GONOCYTISUS.

Calyx top-shaped, obliquely truncate, obsoletely 2-lipped, the upper lip short, with 2 remote teeth, the lower 3-toothed. Keel not deflexed. Claws of lower petals adnate to stamen-tube. All the stamens connate in a closed tube, with anthers bearded at base and apex. Pod obliquely rhomboidal or oblong, flattened, 1-2-seeded — Tall shrubs with slender, green branches, all the leaves except the upper trefoil, and small, yellow, racemed flowers.

G. pterocladus, Boiss. ♄ 2 to 5, appressed hairy or glabrescent ; branches angled, the younger twigs triangular, winged. Leaves sessile, leaflets oblong to linear, obtuse. Racemes long, loose ; pods oblong-rhomboid, with thick border — Summer — Dry hills ; coast, and lower slopes of coast ranges from latitude of Lebanon and northward.

FIG. 90.



Pod of G. pterocladus.

11. SPARTIUM, L. BROOM. *Wuzzâl.*

Calyx membranous, spathe-like, split above, 1-lipped, with 5, minute teeth. Standard broad, round ; claws of wings adherent to staminal tube. Petals of keel separate. All the stamens connate in a closed tube. Pod linear, flattened, many-seeded. Seeds not caruncled — A shrub or small tree, with simple leaves, mostly on the sterile branches, and showy, yellow flowers.

S. junceum, L. ♄ *Wuzzâl.* 1 to 4, trunk woody ; upper branches rush-like, nearly leafless. Leaves oblong to linear-oblong, acute

at both ends. Flowers .02 long and broad, in loose, terminal racemes ; pods glabrous, .07 long — Summer — Hillsides and rocky places ; common.

12. CYTISUS, L. Cytisus.

Calyx 2-lipped. Claws of petals free. All the stamens connate in a closed tube. Pod flattened, oblong to linear, 2-valved. Seeds carunclled — Shrubs, generally thornless, with digitate-trefoil, rarely simple, leaves.

* *Calyx tubular, short-lipped.*

1. C. Cassius, Boiss. ♄ .3 to .6, branches erect, glabrous, crowded. Leaflets twice as long as petiole, *obovate-cuneate*, obtuse or acute, the younger appressed-hairy beneath. Flowers 2-5, capitate ; upper lip of hirsute calyx truncate, acutely 2-lobed, the lower split into 3, linear teeth ; pods .025 long, .006 broad, *densely woolly*, oblong, *rather obtuse* — May and June — Woods ; Mt. Cassius.

Var. **multiflorus,** Post. Heads 8-12 flowered. Branches appressed-hirsute — Woods ; Mt. Cassius.

2. C. drepanolobus, Boiss. ♄ .3 to .8, erect ; branches corymbose or panicled, appressed-hairy. Leaflets green, glabrous above, sparingly appressed-hairy below, *lenticular to elliptical*, or obovate-oblong. Flowers numerous, capitate, enclosed in an involucre of the upper leaves ; upper lip of hirsute calyx deeply bilobed, the lower split into linear-awl-shaped teeth ; pods linear, .025 long, .006 broad, *appressed hirsute, acute, falcate* — May and June — Woods ; Mt. Cassius, and northward.

* * *Calyx top-shaped, campanulate, with lips longer than tube.*

3. C. candicans, L. ♄ .5 to 1, branches long, slender, striate, hirsute. Leaflets hirsute, oblong, mucronate to cuspidate. Flowers 3-9, in *racemes* at the ends of the twigs ; upper lip of calyx bipartite to base, the lower entire ; pods hirsute, falcate, linear, .03 long .005 broad, *torulose.*

Var. **Syriacus,** Post. Branches more slender ; upper leaflets acute — Summer — Pine woods ; middle zone of Lebanon. (*C. Syriacus, Boiss. et Bl.*)

Fig. 91.



Pod of C. candicans. Var. Syriacus

13. ONONIS, L. Ononis.

Calyx deeply 5-parted into nearly equal lobes. Keel beaked. Stamens monadelphous. Anthers alternately short, versatile, and long, fixed at base (except O. ornithopodoides, in which all the anthers are uniform). Pod generally turgid, oblong or linear — Herbs, or rarely shrubs, the stipules adnate to the petioles, and the leaves pinnately trefoil, or rarely of two pairs.

* *Perennials.*

† *Pod erect on a short, erect, not-jointed peduncle.*

1. O. antiquorum, L. ♄ *Shibruq.* .5 to 1, villous and beset with sessile glands, or glabrescent ; branches slender, zigzag, spinescent, *spines* often twin. Leaflets obovate to oblong. Flowers axillary, solitary, loosely racemed ; corolla pink ; pods ovate-elliptical, *shorter than calyx ;* seeds 1-2, *rough-tubercled* — Spring and summer — Fields and waste places.

Var. **leiosperma,** Post. *Seeds smooth* — More common than type in Syria and Palestine. (*O. leiosperma, Boiss*).

Var. **longispina,** Post. Seeds smooth. Spines .04 long — Cedars ; Sheb'a (Gilead) ; Aintâb.

Var. **salsoloides,** Post. Leaves mostly simple, minute, crowded, imbricated. Spines branching — Beirût.

2. O. Columnæ, All. Ped. ♃ .3 to .4, *unarmed,* glandular-pubescent, shrubby at base, stems ascending. Leaflets obovate-oblong. Flowers axillary, overtopped by floral leaves, and forming dense terminal racemes ; corolla *yellow ;* pods villous, ovate-rhomboid, *nearly as long as calyx ;* seeds 3-4, slightly tubercled — Spring — Alpine and subalpine Lebanon, Aintâb, and northward.

† † *Pod pendulous, from a spreading or erect, jointed peduncle.*

3. O. adenotricha, Boiss. ♃ .1 to .2, glandular-pubescent, shrubby at base ; stems ascending, sparingly branched. Leaves pinnate with 2 pairs of leaflets, trefoil, or simple, leaflets obovate, striate. Peduncles axillary, 1-flowered, somewhat longer than petioles, aristate or muticous ; corolla .007 long, yellow, somewhat longer than calyx ; pods oblong, .01 long, hirsute, twice as long as calyx ; seeds 3-4, slightly rough — Summer — Alpine Lebanon and Antilebanon to Aintâb, and northward.

Var. **stenophylla,** Boiss. Leaflets cuneate, linear-oblong ; stipules dilated — Subalpine Lebanon ; Aintâb.

4. O. Natrix, L. ♃ *Littein. Lissaiq.* .8 to 1, or more, glandular-hirsute, viscid. Leaflets oblong, denticulate. Flowers in terminal, leafy racemes ; peduncles long, 1-flowered, often aristate ; calyx lobes many times as long as tube, linear-lanceolate ; corolla .015 long, twice as long as calyx, yellow, the standard often striped with red ; pods linear, .02 long, .003 broad, loosely hirsute, about twice as long as calyx ; seeds 6-9, tubercled — Spring and summer — Common in waste places. A showy plant.

Var. **tomentosa,** Boiss. Woolly-canescent.

Var. **stenophylla,** Boiss. *Wesba.* Bushy, green or canescent. Leaves and stipules crowded on the short branches, leaflets small, linear. Flowers smaller than in type — Sands of coast — Jebel Husha' (Moab).

Var. **microphylla,** Boiss. Green. Stems .15 to .25, corymbose. Leaflets small, round, obovate, or oblong — Jerusalem.

Var. **macrophylla,** Post. Green. Leaflets *large, obovate to oblong, truncate,* serrate. Flowers .02 long — Sarada.

Var. **laxiuscula,** Post. Branches *loose, spreading, slender.* Leaflets linear, obsoletely serrate, Flowers scattered, corolla .01 long ; peduncle long-awned — Coast ; Haurân ; Lebanon.

5. O. vaginalis, Vahl. ♃ .2 to .5, woolly-canescent, viscid ; branches ascending, densely covered with *imbricated, sheathing stipules,* with or without subsessile leaves ; leaflets 1-3, small, fleshy, obovate, denticulate. Flowers in short racemes ; peduncles 1-flowered, thrice as long as leaves ; calyx-lobes *once and a half to twice as long as top-shaped tube ;* corolla yellow, .008 long, twice as long as calyx ; pods oblong, .01 long, thrice as long as calyx ; seeds 6-8, roughish — Spring — Sandy places along coast ; Antilebanon ; Damascus plain.

* * *Annuals.*

† *Pod pendulous from an erect, non-jointed peduncle.*

6. O. reclinata, L. ⊙ .2 to .3, glandular-villous ; stems spreading. Leaves petioled, the lowest simple, the others trefoil with obovate-cuneate to linear, truncate, serrate leaflets. Flowers .005 long, axillary, scattered, or forming a short, leafy raceme, peduncles 1-flowered, stiff, as long as the leaf, recurved at apex, not awned ; calyx-lobes *hirsute,* 4-5 times as long as top-shaped tube ; corolla *purple,* about as long as calyx, pod hirsute, cylindrical, .007 long ; seeds 12-16, rough-tubercled — Spring — Sandy fields along coast, and around Dead Sea.

Var. **minor,** Boiss. Foliage crowded ; plants smaller. Corolla and pods shorter than calyx — Aleppo ; Arabia Petræa and southward.

7. O. pubescens, L. *Dibbaiqah.* ⊙ .3 to .4, loosely villous and stipitate-glandular ; stem rather stout, with corymbose branches. Leaves rather long-petioled, the lower and higher simple, the others trefoil with large, obovate to elliptical, denticulate leaflets. Racemes terminal, short, dense ; peduncles 1-flowered, nearly as long as calyx ; calyx parted nearly to base into oblong-lanceolate, 5-nerved lobes ; corolla *pale yellow,* .012 long, *somewhat longer than calyx ;* pod *ovate-rhomboid,* .01 long, somewhat flattened, shorter than calyx ; seeds 2-3 — Spring — Fields ; common.

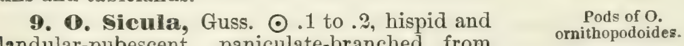
† † *Pods pendulous, from spreading or erect, jointed peduncles.*

8. O. ornithopodoides, L. ⊙ .2 to .3, paniculate-branched, glandular-pubescent. Lowest leaves simple, the others trefoil, with ovate to oblong-cuneate, serrate leaflets. Peduncles 1-2-flowered, aristate, somewhat longer than petiole ; calyx-lobes awl-shaped, about 4 times as long as tube, as long as .006 long, yellow corolla ; pod *linear-oblong,* flattened, *torulose,* .02 long, twice to thrice as long as calyx-lobes. Seeds 8-10, coarsely tubercled — Spring — Fields ; coast, lower mountains and tablelands.

FIG. 92.



Pods of O. ornithopodoides.



9. O. Sicula, Guss. ⊙ .1 to .2, hispid and glandular-pubescent, paniculate-branched from base. Lowest leaves simple, the others trefoil, with *oblong to linear,* sharply serrate leaflets, Peduncles 1-flowered, long-aristate, nearly as long as leaves ; calyx-lobes lanceolate-subulate, four times as long as tube, longer than pale yellow, .006 long corolla ; pod hairy, cylindrical .01 long, *twice* as long as calyx ; seeds 20-26, rough — Spring — Aleppo ; Palmyra ; Judæan desert ; Beirût.



FIG. 93.

Pod of O. breviflora. (a.) The joint and awn of the peduncle.

10. O. breviflora, DC. ⊙ .2 to .3, hispid and stipitate-glandular, paniculate -branched from base. Leaves petioled, the lower and upper simple, the rest trefoil, with oblong-elliptical, obtuse, *denticulate* leaflets. Peduncles 1-flowered, long-awned, about as long as leaves ; calyx-lobes lanceolate-subulate, *five times as long as tube, overtopping* the pale yellow, .008 long corolla ; pod hirsute, cylindrical, .015 long, *a little longer than calyx ;* seeds 10-12, rough — Spring — Fields ; common along coast, and in lower mountains.

11. O. biflora, Desf. ⊙ .2 to .3, glandular-pubescent, stem erect, branching. Lower leaves sometimes simple, the rest *pinnately trefoil*, short petioled, with oblong-obovate to oblong, obtuse or truncate leaflets, *coarsely serrate toward apex.* Peduncles 1-2-*flowered*, aristate, about as long as leaf ; calyx-lobes lanceolate-subulate, *twice as long as tube, half as long* as whitish-yellow corolla ; pods stipitate, cylindrical, hirsute, .02 long, *three to four times as long as calyx ;* seeds 12-14, globular-reniform, tubercled — Fields ; Jerusalem ; Moab ; Kurd Dagh ; Marash.

† † † *Pod erect, as also the short, non-jointed peduncle.*

‡ *Corolla bright yellow.*

12. O. variegata, L. ⊙ .1 to .3, decumbent or prostrate, pubescent with spreading, jointed hairs. Leaves nearly sessile, the lowest sometimes trefoil, *the rest simple*, obovate conduplicate or plicate, with *elevated nerves ending in mucronate teeth.* Flowers axillary, arranged in loose, terminal racemes ; peduncle *shorter than calyx-tube ;* calyx-lobes lanceolate, as long as tube ; corolla *twice as long as tube*, the standard pubescent ; pod oblong, .008 long, longer than calyx ; seeds 12-14, smooth — Spring — Sands, along coast.

‡ ‡ *Corolla pink.*

13. O. hirta, Desf. ⊙ .1 to .3, *crisp-hirsute ;* stems ascending or diffuse. Leaves petioled, the lowest and floral simple, the others trefoil with obovate to elliptical and oblong, sharply denticulate leaflets. Flowers short-peduncled forming terminal, dense racemes ; calyx-lobes lanceolate, thrice as long as tube, scarcely shorter than corolla ; pod ovate, .004 to .006 long, *shorter than calyx ;* seeds 3-4, smooth — Spring — Sandy places ; coast and interior plains. Too near the following.

14. O. serrata, Forsk. ⊙ .2 to .3, pubescent-viscid ; stems decumbent or prostrate. Leaves rather long-petioled, the lower and middle trefoil, the floral simple, the leaflets oblong to oblong-linear, acutely serrate. Racemes terminal, dense, becoming loose ; peduncles short or 0 ; calyx-lobes lanceolate-subulate, 3-4-times as long as tube, a little shorter than corolla ; pod ovate, .004 to .005 long, *hardly as long as calyx ;* seeds 3-5, tubercled-scabrous — Spring — Sandy places along coast.

Var. **major,** Boiss. Stems more erect and robust. Leaflets obovate-oblong. Flowers and pods larger — Coast ; Hhûleh.

15. O. phyllocephala, Boiss. ⊙ .3 to .4, hirsute ; stems ascending. Leaves short-petioled, trefoil with obovate to oblong or oblong-linear, striate, acutely serrate leaflets. Flowers nearly sessile, *crowded in an oblong spike or head* with imbricated usually simple floral leaves, in fruit much elongated ; calyx-lobes lanceolate acuminate, thrice as long as tube, longer than corolla ; pod ovate, .004 long, *half as long as calyx ;* seeds 1-2, tubercled or smooth — Spring — Fields along the coast.

Further study may reduce the last three species to one.

16. O. mitissima, L. ⊙ .4 to .5, stems erect, branching, sparsely crisp-puberulent. Leaves short-petioled, glabrescent, shining, the lower trefoil, the upper simple, leaflets elliptical, cuneate at base, striate, sharply denticulate. Flowers short-peduncled, forming .02 to .03 long, dense, terminal, oblong spikes, leafy at base, *bracteate with leafless, inflated, white, scarious, imbricated stipules, covering the calyx-tubes ;* calyx-lobes lanceolate, *spiny-tipped,* ciliate, as long as tube, somewhat shorter than corolla ; pods ovate, .005 long, nearly as long as calyx ; seeds 2-3, tubercled — Spring — Fields ; common to subalpine regions of mountains.

17. O. alopecuroides, L. ⊙ .3 to .5, sparingly hairy, stem erect, branching. Leaves *simple, sessile, with a two-eared, stipular sheath,* oblong to elliptical, .03 long, .015 broad, truncate, or obtuse, serrate. Flowers nearly sessile, forming .04 to .1 long, dense, terminal spikes ; floral leaves linear ; calyx-lobes hirsute, linear, twice as long as tube, longer than corolla ; pod ovate, half as long as calyx ; seeds 2, shining, slightly pitted — Spring — Fields ; coast to middle zone of mountains.

14. TRIGONELLA, L. Trigonella.

Calyx-lobes 5. Keel obtuse. Stamens diadelphous, free from petals ; filaments not dilated at apex. Pod linear, lanceolate, oblong, or ovate, terete or compressed, sometimes flat and broad, beaked — Annual, rarely perennial herbs, exhaling the odor of Coumarin, with pinnate-trefoil leaves, stipules adnate to petiole.

* *Pods oblong, linear, or lanceolate, terete or compressed.*

† *Pods erect or spreading.*

‡ *Flowers capitate, blue, pods oblong, oblique,* .003 to .015 *long.*

1 T. azurea, 2 Besseriana.

‡ ‡ *Flowers sessile, axillary, solitary or twin, yellowish-white or bluish ; pods long, terete, long-beaked, with anastomosing nerves.*

3 T. Fœnum-Græcum, 4 Cassia.

‡ ‡ ‡ *Flowers in umbels, heads, or short racemes,* .004 *to* .008 *long, (ours) yellow. Pods linear, terete or flattened, reticulate, with a suture on both edges.*

§ *Common peduncle as long as leaf or longer.*

5 T. astroites.

§ § *Common peduncle short or* 0.

6 T. spinosa, 7 crassipes, 8 Monspeliaca, 9 Noeana, 10 monantha.

† † *Pods deflexed, sometimes ascending, then spreading.*

‡ *Pods cylindrical, tapering at tip ; sutures indistinct.*

§ *Pods striate lengthwise. Flowers .008 to .012 long, yellow.*

10 F. strangulata, 12 Aleppica, 13 Cœlesyriaca.

§ § *Pods reticulate or smooth.*

¶ *Seeds ovate or oblong. Flowers .006 to .01 long, yellow, or whitish.*

14 T. Spruneriana, 15 Hierosolymitana, 16 Kotschyi, 17 Sibthorpii.

¶ ¶ *Seeds cylindrical . Flowers .004 to .008 long, yellow or pink.*

18 cylindracea, 19 filipes, 20 lilacina, 21 velutina.

‡ ‡ *Pods linear to linear-oblong, more or less flattened, short-beaked.*

§ *Flowers racemed- capitate.*

22 T. corniculata, 23 hamosa, 24 laciniata.

§ § *Flowers umbelled-capitate.*

25 T. maritima, 26 stellata.

‡ ‡ ‡ *Pods capitate, flattened,* 1-*seeded, with or without a hooked beak.*

27 T. spicata, 28 minima.

* * *Pods flat, parchment-like, striate with transverse, parallel or netted nerves, deflexed ; flowers yellow.*

† *Pods capitate-umbelled, semilunar, sutures not winged or toothed.*

29 T. glomerata.

† † *Pods racemed, falcate, one or both sutures spiny-ciliate or eroded-dentate.*

30 T. Arabica, 31 radiata, 32 Schlumbergeri.

1. T. azurea, C.A.M. ⊙ .05 to .2, velvety, stems erect or diffuse. Stipules half-ovate, lanceolate, the lower dentate ; leaflets obovate, dentate at tip. Peduncle twice as long as leaf ; heads dense, ovate, in fruit oblong ; calyx half as long as blue, .012 long corolla ; pods hirsute, *lanceolate*, .015 long, somewhat curved, 4-6-seeded — Spring — Plain between Aintâb and the Euphrates.

2. T. Besseriana, Ser. .3 to .5, sparingly hairy, erect or decumbent. Leaves oblong-obovate-cuneate to oblong-linear. Peduncles twice as long as leaves ; heads ovate, in fruit oblong, spike-like ; pods .003 long, twice to thrice as long as calyx ; beak shorter than pod ; seeds 1-2 — Spring — Fields ; Beirût. A plant of Asia Minor, probably adventive in Syria.

3. T. Fœnum-Græcum, L. Fenugreek. *Hhilbah.* .2 to .5, sparingly pubescent, erect. Leaflets obovate, to oblong, dentate toward tip. Flowers solitary, rarely twin, *yellowish-white ;* pods linear, terete or somewhat flattened, slightly curved or straight, .08 to .15 long, .004 thick, tapering into a beak one-third their length ; seeds 10-20 — Spring — Fields. Perhaps escaped from cultivation. The sweet smelling seeds are used to give savour to hay that has become musty.

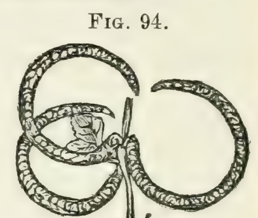
Var. **Berythea,** Post. A lower plant. Leaflets obovate-cuneate to oblong cuneate. Flowers cærulescent. Nerves of pods only slightly anastomosing — Fields ; common. (*T. Berythea, Boiss.*)

4. T. Cassia, Boiss. ⊙ .04 to .1, sparingly hirtulous. Leaflets small, glabrescent, cuneate, truncate or retuse, denticulate at tip. Flowers solitary, *pale violet;* pods .04 to .06 long, beak one-third to one-half as long as pod ; seeds 6-8 — Spring — Mt. Cassius. Probably a variety of the last.

5. T. astroites, F. and M. ⊙ .1 to .15, sparingly appressed-pubescent ; stems ascending. Leaflets small, cuneate-obcordate, denticulate toward apex. Flowers 6-12, sessile, capitate ; pods puberulent, linear, .02 long, .0015 broad, acute, *spreading horizontally, stellate,* transversely wrinkled-netted ; seeds 4-6, the seed-bearing-suture straight, *the other sinuate* — Spring — Hillsides ; Haurân to Palmyra, Antilebanon, Hamath, Aintâb, and northward and eastward.

6. T. spinosa, L. ⊙ .2 to .4, sparingly appressed-hairy, erect or diffuse. Leaflets obovate-cuneate to obcordate. dentate to apex. Peduncles very short, aristate ; flowers 3-4, sessile ; pods glabrous, *spreading, recurved in a semicircular or circular form,* .03 to .06 long, .002 broad, acute ; seeds numerous — Spring —Fields ; common.

Fig. 94.



Pods of T. spinosa.

Var. **longipes,** Post. Peduncle as long as leaf or longer — Coast.

7. T. crassipes, Fenzl. ⊙ .1 to .2, appressed-hairy, prostrate or ascending. Leaves small, *obtriangular,* retuse, denticulate at apex. Peduncle very short ; flowers 5-10, sessile, capitate ; pods appressed-hairy, *erect, parallel or connivent,* linear, .02 to .03 long, and .002 broad, acute, sutures thick — Spring — Fields ; Antilebanon to Aleppo, Aintâb, and northward.

Fig. 95.



Pods and leaves of T. crassipes.

8. T. Monspeliaca, L. ⊙ .1 to .4, appressed-pubescent. Leaflets obovate-cuneate to rhomboid, acutely denticulate above. Peduncle 0 ; flowers 6-18, densely capitate in axils ; pods hairy or glabrescent, linear, .015 long, .002 broad, obtuse, *stellate* — Spring — Fields and waste places ; common.

Var. **petiolata,** Post. Petioles much longer than pods —Beirût.

9. T. Noeana, Boiss. ⊙ .1 to .2, sparingly appressed-puberulent, erect or decumbent. Leaflets cuneate-obovate or oblong, acutely denticulate. Peduncles short or 0 ; flowers 1-3, sessile ; pods appressed-hairy, linear, .04 to .06 long, .002 broad, netted-veined, *curved upward* — Spring — Fields ; Aintâb, and northward.

10. T. monantha, C.A.M. ⊙ .1 to .3, appressed-hairy, decumbent. Leaflets obovate-cuneate, rounded or truncate at apex, *or oblong, incised-pinnatifid.* Flowers *solitary* or rarely in pairs, sessile or nearly so ; pods linear, .06 long, .002 broad, appressed-hairy, terete,

erect or more or less curved, sometimes hooked at tip, netted-veined — Spring — Grassy places; Haurân to Cœlesyria, Damascus, Palmyra, Aintâb, and northward.

11. T. strangulata, Boiss. ⊙ .1 to .3, appressed-puberulent, stems erect or ascending. Leaflets obtriangular, truncate, obtusely denticulate. Peduncles longer than leaf, aristate; flowers 4-7, loosely racemed, .008 long; pods appressed-hairy, .02 long, .003 thick, *torulose, semicircular*, 3-4-seeded — Spring — Antilebanon.

12. T. Aleppica, Boiss. et Haussk. ⊙ *Hhandaqûq*. .2 to .4, glabrescent, stems erect and decumbent. Leaflets obovate-cuneate, truncate, dentate above. Peduncle nearly as long as leaf; flowers 6-10, umbellate-capitate; pods glabrous, .04 long, .002 broad, somewhat flattened, curved, *ascending*, at length spreading, mucronulate; seeds cylindrical — Spring — Fields; Cœlesyria to Aleppo, Aintâb, and eastward. Too near the following.

13. T. Cœlesyriaca, Boiss. ⊙ .2 to .4, sparingly hirtulous, stems erect and decumbent. Leaflets obovate-cuneate, rounded, truncate, or retuse at apex. Peduncle nearly as long as leaf; flowers 8-10, umbellate-capitate; pods glabrous, .04 long, .002 broad, somewhat flattened, curved, *ascending*, at length spreading; seeds oblong, truncate at both ends — Spring — Fields; common.

Var. **Gaillardoti,** Boiss. Larger. The leaves .02 long — Common.

Var. **torulosa,** Post. Pods torulose — Haurân; Hums.

14. T. Sprueriana, Boiss. ⊙ .05 to .25, appressed-pubescent, erect or decumbent. Leaflets obovate-cuneate, dentate above. Peduncle as long as leaf, at length elongated; flowers 8-10, capitate-racemed; pods hirsute, *semicircular*, terete, .02 long, .0025 broad, some what torulose, tapering into a slightly hooked, slender point — Spring — Fields; coast and interior plains.

15. T. Hierosolymitana, Boiss. ⊙ .1 to .2, appressed-hairy, erect or procumbent. Leaflets oblong-cuneate to rhomboid, *acutely denticulate nearly to base*. Peduncle longer than leaf, aristate; flowers .01 long, numerous, in an oblong, racemed head, *deep yellow to orange;* pods hirsute, curved, .02 to .03 long, tapering, beakless, muticous — Spring — Fields; common throughout, especially in middle mountain regions and tablelands.

16. T. Kotschyi, Fenzl. ⊙ .1 to .2, appressed-hairy, erect or decumbent. Leaflets oblong-cuneate, denticulate above. Peduncles twice as long as leaf, aristate; flowers .01 long, numerous, in an oblong, racemed head, *white*, turning yellowish in drying; pods curved, appressed-hairy, .02 to .03 long, tapering, *marked by a longitudinal depression at both sides*, sometimes transversely wrinkled, mucronate — Spring — Fields; Gilead and Haurân to Palmyra, Hamath, and northeastward.

17. T. Sibthorpii, Boiss. ⊙ .1 to .2, appressed-puberulent, procumbent. Leaflets obovate-cuneate to obtriangular, denticulate toward tip. Peduncle thick, *even in fruit shorter than leaf;* flowers .006 long, *capitate, yellow;* pods velvety, falcate, *of two kinds, some near the*

base of the stem (not always visible), .008 *long, netted-veined, the others cylindrical, somewhat torulose*, .02 long, curved, tapering into a sharp point — Spring — Fields ; coast and interior.

18. T. cylindracea, Desv. ⊙ .1 to .15, appressed-hairy, stems decumbent. Leaflets oblong-cuneate, truncate, acutely denticulate toward tip. Peduncle filiform, longer than leaf ; flowers 7-8, capitate, yellow, .005 long ; pods appressed-puberulent, cylindrical, curved, .015 long, .0015 broad, tapering at apex, acute — Spring — Sandy places along coast.

19. T. filipes, Boiss. ⊙ .1 to .2, appressed-puberulent, stems filiform, erect or procumbent. Leaflets obovate-cuneate, acutely denticulate above. Peduncle filiform, twice as long as leaf ; flowers 15-20, racemed-capitate, .005 long, yellow ; pods appressed-puberulent, *the seed-bearing portion* 1-2-*seeded*, .004 *long*, .001 *broad, cylindrical, forming an obtuse angle with the subulate*, .008 *long beak* — Spring — Haurân to Palmyra, Damascus, Antilebanon, Cœlesyria, Lebanon, Nusairy Mountains, Aleppo, and northward.

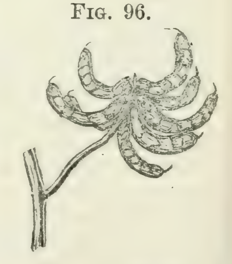
20. T. lilacina, Boiss. ⊙ .2 to .4, appressed-pubescent, procumbent or spreading. Leaflets oblong-obovate, cuneate, denticulate above. Peduncle longer than leaf ; flowers numerous, in racemed heads, *lilac*, .008 long ; pods puberulent, cylindrical, 2-3-seeded, .015 long, .001 broad, tapering into an acute beak — Spring — Nazareth ; Mt. Carmel ; Beirut.

21. T. velutina, Boiss. ⊙ .06 to .15, woolly-canescent. Leaflets *oblong-linear*, denticulate above. Peduncle somewhat longer than leaf, aristate ; flowers numerous, yellow, in racemes which become oblong after flowering ; pods woolly, curved, .008 to .01 long, 2-seeded, tapering into a short, acute beak — Spring — Antilebanon.

22. T. corniculata, L. ⊙ .15 to .25, appressed-hairy or glabrescent, erect or ascending. Leaflets obovate to oblong, dentate. Peduncle twice to four times as long as leaf ; heads ovate to oblong ; flowers .007 long ; pods falcate, .02 long, .002 broad — Spring — Jerusalem ; Beirût.

23. T. hamosa, L. ⊙ '*Usheib-el-melek. Daraqraq. Kuteihah.* .1 to .25, sparingly appressed-hairy or glabrescent, decumbent. Leaflets obovate-cuneate, dentate, truncate or retuse. Peduncle as long as leaf, aristate ; heads spherical ; flowers .005 long ; pods falcate, .008 to .013 long, .0015 broad — Spring — East side of Dead Sea, and southward to Egypt.

FIG. 96.



Pods of T. hamosa.

24. T. laciniata, L. ⊙ *Derâq.* .3 to .5, sparingly pubescent, prostrate. Leaflets *obtriangular-oblong, acutely incised, serrate* at apex. Peduncle about as long as leaf ; heads spherical, flowers .006 long ; pods oblong, .008 long, .003 broad — Winter and spring — Marshes of the plain of Sharon.

25. T. maritima, Del. ⊙ .1 to .4, sparingly pubescent or glabrescent, diffuse. Leaflets cuneate-obovate or obcordate, obtusely denticulate. Peduncles shorter than leaf ; flowers .005 long ; pods

very strongly deflexed, curved, .01 to .013 long, .002 broad, tapering-acute at tip, very obliquely reticulate — Winter and spring — Philistine plain, and southward.

26. T. stellata, Forsk. ⊙ .05 to .35, glabrescent, prostrate, diffuse. Leaves long-petioled, leaflets cuneate-obovate to cuneate-orbicular, truncate or retuse, denticulate. Flowers *nearly sessile* in the axils, .004 long ; pods *stellate-spreading* or deflexed, .01 long, .001 thick, obliquely netted — Spring — Dead Sea and Sinai to Egypt and westward.

27. T. spicata, Smith. ⊙ .2 to .4, sparingly hairy or glabrescent, erect or ascending. Leaflets obovate-truncate to elliptical-linear. Peduncles twice to thrice as long as leaves ; heads ovate to oblong, in fruit oblong ; flowers .008 long, pods crowded, ovate-oblong, .005 long, exclusive of the long, *strongly hooked tip*, .003 broad — Spring — Fields ; common.

28. T. minima, Paine. ⊙ .04 to .1, appressed-hairy. Leaflets obovate-oblong, cuneate, denticulate. Peduncles long ; flowers 10-20 in an oblong head, .006 long ; pods .006 to .008 long, terete, 1-seeded, *with a long, spreading, straight* beak — Spring — Top of Jebel Husha'.

29. T. glomerata, Hort. Paris. ⊙ .05 to .1, appressed-pubescent, erect or diffuse. Leaflets minute obovate-cuneate, to elliptical-rhomboid, retuse, denticulate above. Flowers nearly sessile, minute ; pods flat, *half-ovate-quadrate*, .007 long, .006 broad, obliquely beaked, *transversely parallel-nerved* — May and June.

Var. **Cilicica,** Boiss. Peduncles about as long as leaves — Mt. Cassius.

Var. **Aucheri,** Boiss. Pod .004 long, .003 broad ; heads nearly sessile — Cedars of Lebanon ; Berytdagh and northward.

30. T. Arabica, Del. ⊙ .5 to .6, nearly glabrous ; stems ascending, branched. Leaflets cuneate-obcordate, coarse-toothed or repand at apex. Peduncles somewhat longer than leaves, umbels 3-8-flowered ; corolla *pale yellow*, .01 long ; pods glabrous, oblong, *falcate*, .015 to .3 long, .008 broad, *both sutures spiny-ciliate* — Spring — Sandy places ; coast, Jordan Valley, and southward to Sinai.

FIG. 97.



Pod of T. Arabica.

31. T. radiata, L. ⊙ .1 to .25, appressed-pubescent, prostrate or ascending. Leaflets obovate to oblong, denticulate at tip. Peduncles nearly as long as leaf, 1-2-flowered ; corolla *deep yellow*, .005 long ; pods oblong, *circularly curved*, .01 broad, .04 long on their *outer, spiny-ciliate, and* .01 *long on their inner, winged, fringed suture* — Spring — Rocky places and old fields ; Cœlesyria, to Antilebanon, tablelands East of the Jordan, and northward.

32. T. Schlumbergeri, Boiss. ⊙ .15, nearly glabrous. Leaflets *minute*, cuneate-obcordate, mucronate, dentate at apex. Peduncles capillary, longer than petiole ; flowers .005 long, pale yellow, umbel-

led, 2-4 ; pods half ovate, .01 to .014 long, transversely striate, the inner suture straight, the outer convex, both with *dentate-eroded* wing, .001 to .002 broad — Spring — Lebanon — A species intermediate between Pectinatæ and Samaroideæ.

15. MEDICAGO, L. Medick.

Calyx short, 5-toothed. Keel obtuse. Stamens diadelphous, free from petals ; filaments not dilated at tip. Pod 1-many-seeded, spirally falcate or coiled, style often spirally incumbent at base on the face of the pod — Herbs with pinnately trefoil leaves, and stipules adnate to petiole.

* *Perennials. Pod flattened, falcate or snail-like with pervious centre.*

1 M. falcata, 2 sativa, 3 marina.

* * *Annuals. Pods flattened, coiled, with closed centre.*

† † *Coils membranous with acute, entire margin.*

4 M. scutellata, 5 orbicularis.

† † *Coils membranous or thickish, with triangular spines, not grooved at base.*

6 M. Blancheana, 7 rotata.

† † † *Coils thickish, margin not spiny, surface transversely or obliquely reticulate.*

8 M. elegans, 9 Shepardi, 10 Noëana.

† † † † *Coils incumbent, crowded, margin thick, unarmed, or armed with tubercles or prickles with one root.*

‡ *Pod cylindrical, truncate at base and apex.*

11 M. littoralis, 12 tribuloides.

‡ ‡ *Pod ovate or globular, convex at base and tip.*

13 M. tuberculata, 14 Gerardi.

† † † † † *Coils loose, incumbent, prickles arising from two roots, the posterior root from a nerve concentric to margin.*

‡ *Pod disk-like, flattened.*

15 M. agrestis, 16 coronata, 17 Galilæa, 18 Granatensis, 19 denticulata.

‡ ‡ *Pod ovate globular.*

20 M. maculata, 21 minima, 22 laciniata, 23 Aschersoniana, 24 ciliaris.

* * * *Annuals. Pod kidney-shaped, 1-seeded, spirally curved at tip.*

25 M. lupulina.

1. M. falcata, L. ♃ .3 to .5, appressed-pubescent, erect or ascending. Stipules ovate-lanceolate-subulate ; leaflets retuse, mucronate, oblong-obovate to linear-cuneate. Racemes many-flowered, subcapitate ; peduncles longer than leaves ; flowers *yellowish-white or yellow, rarely violet ;* pod *falcate or with one coil* — Summer — Fields ; Lebanon ; Aintâb. Too near the following.

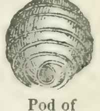
2. M. sativa, L. ♃ *Qutât. Duhhraijah.* .3 to .5, appressed-pubescent. Stipules ovate-lanceolate-subulate ; leaflets retuse, mucronate, oblong-obovate to linear-cuneate. Racemes many flowered, oblong-capitate ; peduncles longer than leaves ; *flowers blue or violet, rarely yellow ; pod of two or three coils* — Summer — Hills and grassy places : cultivated and subspontaneous.

3. M. marina, L. ♃ .2 to .4, canescent-woolly, stems prostrate or ascending. Stipules nearly entire ; leaflets obovate, denticulate at apex. Peduncles 5-12-flowered nearly as long as leaf ; flowers yellow, .006 long ; pod woolly, disk-like or cylindrical, truncate at both ends ; coils 3 or less, loose ; margin obtuse, broad, flattish, 1-nerved to middle, unarmed or remotely prickly with short, conical, awl-shaped spines — Spring — Sands of coast.

4. M. scutellata, All. ⊙ .3 to .5, glandular-pubescent. Stipules ovate, dentate ; leaflets rather large, obovate-oblong to elliptical, acutely denticulate. Peduncles 1-3-flowered, much shorter than leaves ; *flowers* .004 *long, orange ;* pod .013 to .015 in diameter, *of* 5-6 *coils, spires cup-shaped, concentric, obliquely netted-veined,* with entire, acute margins — Spring — Fields ; everywhere.

Fig. 98.





Pod of M. scutellata.

5. M. orbicularis, All. ⊙ .3 to .5, glabrescent. Stipules crested-fringed ; leaflets obcordate to obovate, denticulate at apex. Peduncles 1-3-flowered, shorter than leaves ; *flowers* .003 long, *yellow;* pod *orbicular*, .01 to .02 in diameter, *depressed-lenticular*, rather convex on both sides, coils 2-5, *membranous, radiately netted-nerved ;* margins *thin, entire* — Spring — Fields ; everywhere.

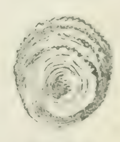
Fig. 99.

Pod of M. orbicularis.

6. M. Blancheana, Boiss. ⊙ .3 to .5, appressed-puberulent. Stipules lanceolate, dentate ; leaflets obovate-oblong, dentate above. Peduncles 1-2-flowered, nearly as long as the leaves ; flowers .008 long, orange ; pod .012 broad, puberulent, depressed-cylindrical, plano-convex on both faces, coils 4-5, loose, nearly membranous, with *obsoletely netted* surface, margin thin, destitute of a nerve on each side, and beset with *triangular flattened, short prickles, at right angles to face of coils* — Spring — Fields ; especially along coast.

Var. **inermis,** Post. Margin nearly or quite unarmed — Beirut ; Haurân.

Fig. 100



Pod of M. Blancheana.

7. M. rotata, Boiss. .2 to .4, appressed-hairy. Stipules dentate ; leaflets obovate-oblong, those of the lower leaves truncate. Peduncles 1-6-flowered, somewhat longer than leaf ; corolla .006 long, yellow ; pod glabrous, short-cylindrical, flattish at both ends, .008 broad, coils 4, adjacent, surface netted, margin thin, obtuse, *furnished on both sides with a concentric nerve*, and triangular short prickles *between the* nerve and margin, at a right angle to the face of the coil — Spring — Hills and fields ; common throughout.

8. M. elegans, Jacq. ⊙ .2 to .4, pubescent-glandular. Stipules dentate ; leaflets obovate, truncate or rounded, dentate toward

tip. Peduncles 1-3-flowered, shorter than leaves ; flowers .004 long, orange ; pod pubescent or glabrous, disk-like, of 2-3 coils, radiately netted-nerved, *nerves at obtusely keeled margin transverse, more prominent* — Spring — Fields ; coast to middle zone of mountains.

9. M. Shepardi, Post. ⊙ (Sp. nov. Journal Linnæan Soc., Botany, Vol. XXIV., p. 425.) .2 to .3 pubescent, stems ascending. Stipules nearly entire ; leaflets *minute*, obovate-cuneate. Peduncles longer than leaves, 2-4-flowered ; flowers minute ; pods pubescent, flat, .004 broad, of two loose, netted-veined coils, the veins anastomosing near the nearly entire margin in a prominent, wavy-tubercled nerve, parallel to the margin. (Named in honor of Mrs. Shepard, M.D., of Aintâb) — Spring — Aintâb.

FIG. 101.

Pod of M. Shepardi, magnified two and a half diameters.

10. M. Noeana, Boiss. ⊙ .2 to .4, soft-pubescent. Stipules denticulate or entire at base ; leaflets obovate-oblong, acutely dentate above. Peduncles 1-2-flowered, longer than leaves ; corolla minute ; pod ovate-globular, .005 broad, coils 3-4, thick, rather loose, radiately nerved, nerves toward the obtuse, often somewhat grooved margin, *dilated into folds oblique at base, parallel to the margin and ending in it* — Spring — Aintâb, and northward and eastward.

11. M. littoralis, Rohde ⊙ .2 to .4, appressed-villous ; stipules fringed at base ; leaflets obcordate to obovate, denticulate at apex. Peduncles 2-4-flowered, flowers medium-sized, orange ; pod .006 long and broad, cylindrical, flattened at each end, coils 3-5, closely adjacent, surface netted-veined, margin thick, at length *flat*, with a prominent nerve, beset with 2 rows of *rather remote, awl-shaped*, hooked prickles — Spring — Sands of coast.

Var. **subinermis,** Boiss. Pod with short prickles or tubercles — Common with type.

12. M. tribuloides, Desv. ⊙ .2 to .4, appressed-villous. Stipules fringed at base ; leaflets wedge-obovate to obcordate. Peduncles 1-2-flowered, shorter than leaf ; flowers rather large, yellow ; pod .006 to .012 long and broad, cylindrical, flat at both ends, with 5, thick, appressed coils, and obtusely or acutely keeled margin, *grooved on both sides*, and *closely* beset with two rows of *conical*, erect, divergent, or appressed prickles — Spring — Fields ; Damascus ; Beirût ; Arabia Petræa.

13. M. tuberculata, Willd. ⊙ .3 to .4, pubescent. Stipules dentate ; leaflets obovate-cuneate to oblong. Peduncles 2-8-flowered ; flowers .008 long, orange ; pods ovate-cylindrical to globular, .006 to .01 long, .005 to .008 broad, with 4-6, close coils, the margins 3-nerved, 2-grooved, with *three rows of short, crowded tubercles, or short, connivent, hooked prickles* — Spring — Fields ; common throughout.

FIG. 102.



Pod of M. tuberculata.

14. M. Gerardi, ⊙ .3 to .4, pubescent. Stipules incised-dentate ; leaflets obovate-cuneate to obcordate. Peduncles 2-5-flowered ; pods glandular-woolly or glabrescent, .008 long and broad, with 5-7, thick spires, the margins rounded, beset with *scattered*, erect, conical-subulate, hooked prickles, with a somewhat grooved base — Spring—Fields ; common.

15. M. agrestis, Ten. ⊙ .1 to .3, pubescent. Stipules cut-toothed ; leaflets wedge-obovate, generally retuse. Peduncle 1-2-flowered, somewhat longer than leaf ; pod pubescent or glabrous, .01 broad; coils 5, appressed, with netted-nerved surface and obtuse margin, grooved on both sides, with two rows of conical, awl-shaped, hooked, erect prickles — Spring — Grassy places ; Antilebanon ; Aleppo.

16. M. coronata, Lam. ⊙ .2 to .4, appressed-puberulent. Stipules dentate at base ; leaflets obovate, often retuse, apex obtusely denticulate. Peduncles 3-8-flowered, filiform, *much longer than leaf ;* flowers minute ; pod .004 broad, hairy or glabrous, coils 2 or less, with concave, netted face, and broad, flat margin, beset on either side with awl-shaped prickles, *at right angles with surface of coils, forming a double crown* — Spring — Fields and roadsides ; common.

17. M. Galilæa, Boiss. ⊙ .2 to .4, glabrescent. Stipules deeply and acutely dentate ; leaflets obovate-oblong, acutely denticulate. Peduncles 2-4-flowered, nearly as long as leaf ; corolla .005 long ; pod glabrous, coils 5, rather loose, surface prominently netted-nerved, margin thin, flat, beset on both sides with long prickles at right angles to surface of coils, *grooved along their whole length* — Spring — Plain of Esdraëlon.

Var. **incisa,** Post. Leaflets incised-dentate or lobed — Haurân.

18. M. Granatensis, Willd. ⊙ Glabrescent. Stipules lanceolate, deeply fringed ; leaflets obovate or cuneate, denticulate. Peduncles 1-2-flowered, not longer than leaf ; pod spherical, spires 5-6, veins netted to margin, margin thin, rounded, prickles at right angles to surface of coils, *grooved* only at base — Spring — Jerusalem.

19. M. denticulata, Willd. ⊙ .2 to .5, glabrous or nearly so. Stipules *pinnatifid-dentate ;* leaflets wedge-obovate to obcordate, mucronulate. Peduncles 3-6-flowered, nearly as long as leaf or shorter ; flowers minute ; pod glabrous, .008 broad, coils 2-4, loose, surface strongly netted-veined, margin obtuse, deeply grooved on each side with two rows of awl-shaped, divergent, hooked prickles — Spring — Fields and grassy places ; common.

Var. **lappacea,** Boiss. Pods .008 to .013 broad. Prickles longer than half the diameter of pod.

Var. **pentacycla,** Boiss. Pods .01 to .015 broad, of 5 coils, with long, slender prickles.

Var. **apiculata,** Boiss. Pods .004 to .008 broad, of 2-3 coils, with small prickles, sometimes reduced to tubercles.

20. M. maculata, Willd. ⊙ .3 to .5, glabrescent. Stipules semiovate to semisagittate, dentate ; leaflets often with a black spot; broad-obovate to obcordate. Peduncles 2-3-flowered, shorter than leaf, flowers minute ; pod glabrous, coils 3-5, rather loose, surface slightly and concentrically netted, margin 3-grooved, prickles long, awl-shaped, *reflexed, not hooked,* half as long as breadth of pod — Spring — Weedy places ; less common than the last.

21. M. minima, Lam. ⊙ *Dureis.* .2 to .3, greyish, soft-pubescent. Stipules *entire* or somewhat dentate ; leaflets obcordate to wedge-obovate. Peduncles 2-6-flowered, somewhat shorter than leaf or longer ; flowers minute ; pod puberulent, nearly globular, .005 to

.008 broad, including prickles, coils 4-5, loose, margin thin, grooved on both sides, with two rows of densely crowded, awl-shaped, hooked, erect, 2-limbed prickles, *longer than breadth of pods* — Spring — Fields and grassy places ; common.

22. M. laciniata, All. ☉ .05 to .15, glabrescent. Stipules *fringed ;* leaflets *minute*, wedge-shaped, truncate or retuse, acutely dentate or pinnatifid. Peduncles 1-2-flowered, longer than leaf ; flowers .002 long ; pod glabrous, .003 broad, coils 4-5, rather loose, margin rather broad, obtuse, deeply grooved on both sides, with two rows of crowded, awl-shaped, hooked, diverging, interlaced prickles, at right angles to face of coil — Spring — Gaza, and southward.

Var. **brachyacantha** Boiss. Prickles more or less shortened. Stipules deeply toothed — Arabia Petræa, and southward and eastward.

23. M. Aschersoniana, Urban. ☉ Glabrous or sparingly hairy, procumbent. Stipules lanceolate, rather obtusely denticulate ; leaflets small, cuneate, truncate or retuse. Peduncles 1-2-flowered, scarcely as long as leaf ; flowers minute ; pods small, coils 3-4, with 5-7 veins on face, prickles awl-shaped, hooked, grooved — Spring — Arabia Petræa and southward.

24. M. ciliaris, Willd. ☉ .3 to .5, glabrescent. Stipules incised ; leaflets *obovate-rhomboid.* Peduncles 1-3-flowered, shorter than leaf ; flowers .008 long, yellow ; pod .012 broad, *villous*, coils 6-8, rather loose, surface netted-nerved, margin thick, flat, with two rows of straight, awl-shaped prickles, *appressed to pod*, at right angles to face of coils or spreading, not hooked — Spring — Coast, and coast-range to 800 m.

25. M. lupulina, L. ☉ to ② .3 to .5, pubescent. Stipules ovate, nearly entire, or somewhat toothed at base ; leaflets obovate. Flowers small, *densely spiked ;* peduncle longer than leaf ; pod minute, turgid, glabrous or pubescent, netted-veined — Spring — Weedy places ; common.

FIG. 103.



Pod of M. lupulina, magnified 6 diameters.

16. MELILOTUS, Tourn. MELILOT. SWEET CLOVER. *Hhandaqûq. Daraq.*

Calyx short, 5-toothed. Keel obtuse. Stamens diadelphous, filaments not dilated at apex. Pod (in ours pendulous) globular or ovoid, straight, not beaked, nearly indehiscent, 1-2- rarely 3-seeded — Herbs sometimes shrubby, with pinnately trefoil leaves, and stipules adnate to petiole, and spiked or racemed flowers.

* *Annuals. Grooves of pods concentric.*

1. M. sulcata, Desf. ☉ .2 to .4, erect. Stipules ciliate-dentate, the uppermost entire ; leaflets obovate to wedge-oblong. Pedicels somewhat *shorter* than calyx-tube ; flowers .003 long, yellow ; fruiting racemes .02 to .04 long ; pods round-obovate, .0025 long, keeled, obtuse, wrinkles *nearly touching* — Spring — Fields ; common.

Var. **major,** Camb. Leaflets broader, more intensely green ; fruiting racemes denser ; fruit, and often flowers, larger — Beirût ; Hhûleh.

2. M. infesta, Guss. ⊙ .2 to .6, erect. Stipules ciliate-dentate ; leaflets obovate to wedge-oblong. Pedicels *longer* than calyx-tube ; flowers .006 long, yellow ; fruiting racemes .04 to .07 long, loose ; pod obovate, .0035 long, acutely keeled, obtuse, *wrinkles distant, somewhat irregular* — Spring — Fields ; coast, and mountains to 1000 m.

3. M. Messanensis, L. ⊙ .2 to .4, diffuse, or the central stem erect. Stipules nearly entire ; leaflets obovate to wedge-linear. Flowers .004 long, yellow ; fruiting racemes .01 to .02 long ; pod *ovate-oblong, tapering at both ends*, .005 long, upper suture grooved ; *wrinkles near together* — Spring — Fields ; coast, and mountains to 1000 m.

* * *Annuals. Groôves of pods transverse, curved.*

4. M. elegans, Salzm. ⊙ .2 to 1, erect. Stipules entire ; leaflets obovate to rhombic and wedge-oblong. Flowers .005 long, yellow, racemes often longer than leaf ; pod *ovate-elliptical,* acute, .004 long, seed-bearing suture gibbous ; wrinkles numerous, somewhat curved, *rather remote* — Spring — Carmel ; Aintâb.

* * * *Annuals, biennials, or perennials. Pods netted-wrinkled.*

5. L. parviflora, Desf. ⊙ *Muhheilibah. Qurt.* .2 to .5, erect. Stipules entire ; leaflets obovate to wedge-oblong. Racemes slender, longer than leaf ; flowers .003 long, yellow ; pod *ovate-globular,* .0015 long, obtuse — Spring — Fields ; common throughout.

6. M. officinalis, Desr. ⊙ .5 to 1, erect. Stipules *awl-shaped,* entire ; leaflets obovate to rhombic or oblong, coarse-dentate. Racemes often 1 or more long, on peduncles much longer than the leaves, flowers .007 long, yellow to white ; pods ovate, obtuse, .004 long, mucronate — Spring — Aintâb, and northward.

7. M. alba, Desr. ⊙ to ♃. *Hhandaqûq.* 2 to 4, erect. Stipules *setaceous,* entire ; leaflets obovate-oblong to oblong-lanceolate. Racemes .1 to .2 long, rather dense, on peduncles longer than the leaves ; flowers .004 long, white ; pod obovate, apiculate, .002 long — Summer — Cultivated in Lebanon for pipe-stems, owing to the fragrant odor of the wood.

Var. **parviflora,** Boiss. Flowers minute — Marash.

17. TRIFOLIUM, L. Clover. Trefoil. *Nefleh.*

Calyx-lobes 5. Keel obtuse. Stamens diadelphous, connate with the petals, or at least with the lower ones ; tips of filaments more or less dilated. Pod ovate to oblong-linear, 1-4-seeded, usually indehiscent, membranous, rarely leathery, included in the marcescent calyx or corolla — Herbs, with 3 trefoil, or rarely 5-7 pinnate, leaflets.

Sect. I. Lagopus, Koch. Throat of calyx callous, often hairy, closed or surrounded by a ring of hairs. Heads terminal, rarely axillary ; flowers bractless ; pod included in calyx-tube.

* *Perennials. Upper leaves opposite. Calyx-tube* 10-*nerved.*

1 T. pratense, 2 Cassium.

* * *Annuals.*

† *Calyx-tube* 20-*nerved ; throat open, hairy. Upper leaves opposite.*

3 T. hirtum, 4 Cherleri, 5 lappaceum.

† † *Calyx-tube* 10-*nerved; throat in fruit open, hairy, or closed, callous.*

‡ *Leaves all alternate. Heads terminal, peduncled.*

6 T. arvense, 7 stellatum, 8 velivolum, 9 augustifolium, 10 purpureum, 11 Palæstinum.

‡ ‡ *Upper leaves opposite, forming an involucre. Heads terminal, peduncled. Throat of calyx closed.*

12 T. dichroanthum, 13 formosum, 14 Haussknechtii, 15 Candollei, 16 Latinum, 17 supinum, 18 Carmeli, 19 Alexandrinum, 20 Panormitanum, 21 maritimum, 22 plebeium, 23 Alsadami, 24 scutatum, 25 clypeatum.

‡ ‡ ‡ *Upper leaves opposite or alternate. Heads sessile, axillary or terminal. Flowers minute. Calyx throat closed.*

26 T. scabrum, 27 compactum.

Sect. II. Trichocephalum, Koch. Throat of calyx naked, tube not inflated. Heads axillary. Flowers bractless, a few of the outer ones fertile, corollate, the inner sterile, destitute of corolla, growing medusa-like by the development of the calyx-teeth at maturity.

* *Sterile flowers appearing only as a central nodule before flowering. Calyx-teeth not plumose.*

28 T. subterraneum.

* * *Sterile flowers formed before flowering. Calyx-teeth plumose.*

29 T. globosum, 30 pilulare.

Sect. III. Galearia, Presl. Throat of calyx naked, 2-lipped. Fruiting tube inflated, netted-veined. Heads axillary ; flowers bracteolate ; pod included in calyx-tube.

* *Perennials. Fruiting calyx globular, helmet-shaped.*

31 T. fragiferum, 32 physodes, 33 Germaniciæ.

* * *Annuals, Fruiting calyx globular, villous or woolly.*

34 T. resupinatum, 35 tomentosum, 36 bullatum.

Sect. IV. Vesicastrum, Koch. Throat of calyx naked, tube after flowering more or less inflated, lobes equal. Heads terminal ; flowers bracteolate ; pod inflated, long beaked.

37. T. spumosum, 38 Aintabense, 39 xerocephalum.

Sect. V. Paramesus, Presl. Throat of calyx naked, tube in fruit not inflated. Heads axillary and terminal ; flowers minute, bracteolate, petals connate, marcescent ; pod leathery, somewhat exserted.

40 T. glanduliferum, 41 nervulosum.

Sect. VI. Trifoliastrum, Ser. Throat of calyx naked, 10-nerved. Heads axillary, rarely terminal ; flowers bracteolate, generally pedicelled ; petals persistent, at length scarious ; pod membranous.

* *Annuals.*

† *Heads sessile. Pedicels very short.*

42 T. glomeratum.

† † *Heads long peduncled. Pedicels long, reflexed in fruit,*

43 T. nigrescens, 44 Petrisavii, 45 Meneghinianum.

* * *Perennials. Peduncles longer than leaves. Pedicels reflexed in fruit.*

46 T. repens.

SECT. VII. Chronosemium, Ser. Throat of calyx naked, somewhat 2-lipped. Heads axillary ; flowers pedicelled, at length deflexed ; petals persistent, scarious ; pods stipitate.

* *Perennials. Standard obovate-oblong, convex, at length grooved.*

47 T. rhytidospermum.

* * *Annuals. Standard narrowed at base, spoon-shaped, grooved at tip.*

† *Style nearly as long as pod.*

48 T. comosum, 49 stenophyllum, 50 speciosum, 51 erubescens, 52 Boissieri.

† † *Style much shorter than pod.*

53 T. agrarium, 54 Lagrangei.

* * * *Annuals. Standard not narrowed at base, keeled at back.*

55 T. procumbens.

1. T. pratense, L. ♃ .3 to .5, glabrescent or appressed-hirsute, erect or ascending. Stipules membranous, oblong-ovate, abruptly setaceous ; leaflets ovate to oblong, obtuse. Heads globular, at length ovate, .03 long, .02 broad, involucrate ; calyx about half as long as purple corolla, teeth subulate, about as long as tube — Summer ; Akherdagh).

Var. **villosum,** Post. Stipules villous — Kerhân (Akherdagh).

2. T. Cassium, Boiss. ♃ .4 to .6, appressed-hairy ; stems ascending, simple or sparingly branched. Free portion of stipules lanceolate-subulate ; leaflets elliptical-oblong, nearly entire, those of the upper leaves acute. Heads spherical, at length oblong, .04 long, .03 broad, peduncled or sessile. Lobes of loosely villous calyx plumose, 3-nerved, awl-shaped, at length deflexed, the upper four as long as tube, the lowest twice as long ; corolla pale pink, nearly thrice as long as calyx-tube — June — Woods ; Cassius and Amanus.

FIG. 104.



Head of T. hirtum.

3. T. hirtum, All. ⊙ .2 to .3, villous ; stems erect or spreading. Stipules membranous, adnate below, the free portion ovate to *lanceolate*, caudate-setaceous ; leaflets wedge-obovate. Heads globular, sheathed by the uppermost, dilated stipules ; calyx *half as long as the purple* corolla, lobes setaceous, almost equal, twice as long as the tube — Spring — Dry hills ; Lebanon to Aintâb, and northward. Too near the following.

4. T. Cherleri, L. ⊙ .2 to .3, villous ; stems ascending or prostrate. Stipules dilated, the free part *ovate*, short-caudate ; leaflets wedge-

obovate. Heads depressed-globular, sheathed by the 2-3, much dilated, orbicular, often leafless stipules ; calyx villous, *nearly as long as white* or purplish corolla, lobes setaceous, of equal length, twice as long as tube — Spring — Beirût to Aleppo, and northward.

Fig. 105.



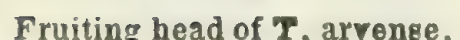
Head of T. lappaceum.

5. T. lappaceum, ⊙ L. .3 to .5, sparingly appressed-hairy; stems erect or diffusely branched. Free portion of stipules lanceolate-subulate ; leaflets obovate to oblong-obcordate. Heads globular, *generally peduncled ;* calyx somewhat shorter than corolla, lobes nearly equal, slightly ciliate, dilated at base, 5-nerved, setaceous at tip, more than twice as long as glabrous tube — Spring — Fields ; common.

6. T. arvense, L. ⊙ *Khozz.* .2 to .5, hirsute, with soft, spreading hairs ; stem erect, branching, slender. Free portion of stipules setaceous ; leaflets *oblong-linear,*

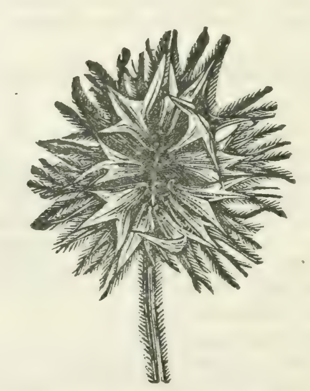
Fig. 106.





Fruiting head of T. arvense.

Fig. 107.



Fruiting head of T. stellatum.

denticulate at apex, the lower often retuse. Heads solitary, dense, *ovate, at length oblong-cylindrical ;* lobes of hispid calyx setaceous, plumose, *longer* than the persistent, pink-white corolla, 2-3 times as long as tube, throat villous, open — Summer — Rocky places ; Middle Lebanon to coast.

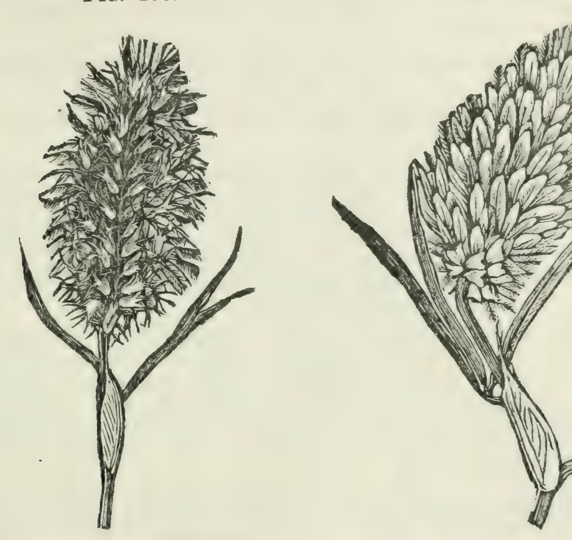
Var. **longisetum,** Boiss. Calyx-teeth often .006 long, longer than corolla, and 4-5 times as long as tube — Lebanon.

7. T. stellatum, L. ⊙ .2 to .3, villous ; stems erect or ascending. Stipules *ovate,* obtuse or acute, dentate ; leaflets small, *wedge-obovate to obcordate.* Heads *globular,* rather loose ; calyx about as long as

the pink to white corolla, lobes lanceolate-subulate, somewhat connate at base, twice as long as tube, at length stellate-spreading, fruiting-tube at length closed by villi — Spring — Grassy places ; common.

8. **T. velivolum,** Paine. ⊙ .2 sparingly *silky ;* stem simple, erect. Stipules *ovate-lanceolate,* scarious, setaceous at tip ; leaflets *linear-lanceolate, acute.* Heads ovate ; calyx-lobes as long as *pale violet* corolla, thrice as long as tube, setaceous, plumose, in fruit stellate-spreading, tube closed in fruit — Spring -- Mountains of Moab.

Fig. 108. Fig. 109.



Head of T. augustifolium, at commencement of fruiting. Head of T. purpureum, var. genuinum.

9. **T. augustifolium,** L. ⊙ .3 to .5, appressed-hirsute, erect. Stipules narrow, the free portion setaceous ; leaflets *linear.* Heads oblong-conical, in fruit oblong, often .08 long, .02 broad, calyx-lobes subulate, *spinescent,* the lowest somewhat longer than the other four, shorter than the *pink* corolla — Spring — Fields ; common.

10. **T. purpureum,** Loisel. ⊙ .2 to .5, appressed-hairy, erect. Stipules membranous, narrow, the free portion awl-shaped ; leaflets linear-lanceolate to elliptical-oblong, obtuse or acute. Heads ovate, in fruit oblong ; calyx one-third to one-half as long as purple corolla, lobes subulate, plumose, truncate at tip, the lowermost longer than tube — Spring — A variable species.

Var. **genuinum,** Post. Tall erect, showy. *Leaflets elliptical-oblong, acute or obtuse.* Heads ovate, .04 long, .03 broad ; lower lobe of calyx twice as long as rest ; fruiting spikes often .05 long, .03 broad — Fields ; common.

Var. **laxiusculum,** Boiss. Ascending or procumbent. Stipules and leaflets narrower. Heads less perfect, smaller ; fruiting spikes

loose, cylindrical, .03 long, .01 broad — Fields ; common.

Var. **Desvauxii,** Post. Leaflets elliptical to elliptical-oblong, obtuse. Spikes smaller, often sheathed by upper stipules — Fields ; common. (*T. Desvauxii, Boiss. et Bl.*)

Var. **prostratum,** Post. *Prostrate densely matted.* Leaves elliptical to elliptical-oblong, short, obtuse, often mucronate. Heads globular in flower ; fruiting spikes .02 to .03 long, .01 broad — Roadsides and dry places ; common.

Var. **Blancheanum,** Boiss. Leaves shorter, obtuse. Fruiting spikes ovate-globular, sheathed at base by upper leaf. Calyx-lobes nearly equal — Common.

Var. **Rousseanum,** Boiss. Heads .015 long, .01 broad, few-flowered — Abeih.

Var. **augustifolium,** Post. Leaflets lenticular-linear — Beirût.

11. T. Palæstinum, Boiss. ⊙ .3, *hispid, with soft, spreading hairs ;* stem branching. Stipules abruptly setaceous-caudate, the upper inflated; leaflets oblong-elliptical to linear, rather obtuse. Heads ovate, at length oblong; calyx very hispid, two-thirds as long as *whitish* corolla, lobes awl-shaped, truncate, rather less than twice as long as tube, the lower somewhat longer, deflexed in fruit — Spring — Sandy places; Beirût to Gaza and Hebron.

12. T. dichroanthum, Boiss. .2 to .4, appressed-hirsute, procumbent. Stipules short-setaceous-caudate, the upper inflated ; leaflets elliptical-linear, obtuse. Flowering heads ovate, .03 long, .02 broad, the fruiting cylindrical; calyx very hirsute, one-third as long as *particolored purple and white* corolla, lobes subulate, nearly equal, longer than tube ; standard *pale flesh colored,* much longer than wings and keel — Spring — Coast.

13. T. formosum, Urv. ⊙ .3 to .5, hirsute, erect. Stipules membranous, *inflated, ovate, with a long lanceolate-subulate tip ;* leaflets elliptical-oblong, often .06 long, .01 broad, acute. Heads ovate, .04 long, .02 broad, in fruit oblong, .05 long, .04 broad ; calyx-lobes lanceolate-subulate, *longer than the purple corolla,* twice as long as tube, somewhat spreading in fruit — Spring — Grassy places ; common. A showy species.

Var. **minus,** Post. Dwarf. Heads .015 long and broad — Waste places.

14. T. Haussknechtii, Boiss. ⊙ .2 to .3, *appressed-villous ;* stems numerous, erect or decumbent. Stipules membranous, the free portion *triangular-lanceolate to triangular-subulate ;* leaflets *oblong to linear-elliptical,* obtuse or acute. Heads generally in pairs, rather long-peduncled, obconical-ovate, in fruit oblong; calyx appressed-silky, one-third as long as the *whitish-flesh-colored* corolla ; lobes subulate, 1-nerved plumose, truncate, straight, as long as tube, the lowermost longer ; fruiting tube *subconical-cylindrical* — Spring — Grassy places; Aleppo.

15. T. Candollei, Post. ⊙ (Sp. nov. Journal of the Linnæan Society, Botany, Vol. xxiv., p. 425.) .2 to .3, *sparingly appressed-pubescent,* decumbent, stems spreading. Stipules membranous, purple-veined,

the free portion triangular-lanceolate; leaflets .005 to .01 long, *elliptical.* Heads long-peduncled, usually twin, in flower obconical-obovate, .015 long, .01 broad, in fruit oblong-ovate, .01 long, .008 broad; calyx appressed-silky, one-half to one-third as long as pinkish-purple corolla, teeth rigid, erect, subulale, plumose, distant, *nearly equal*, the lower a little longer, shorter than the *top-shaped-* truncate tube; fruiting calyces *imbricated, erect* — May — Aintâb.

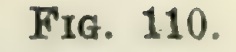
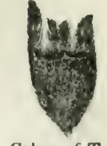


Fig. 110.



Calyx of T. Candollei, magnified 3 diameters.

16. T. Latinum, Sebast. ⊙ .2 to .4, appressed-hirsute; stems ascending, forked. Free part of stipules long, linear; leaflets *linear*, mucronate. Heads generally twin, long-peduncled, ovate; calyx less than half as long as *pink* corolla, lobes triangular, *three nerved at base*, awl-shaped above, ciliate, twice as long as *villous* tube, somewhat unequal; fruiting tube obconical — June — Bushy places; Aintâb.

17. T. supinum, Savi. ⊙ .1 to .5, sparingly pubescent, prostrate or ascending. Free part of stipules *lanceolate-linear;* leaflets obovate-oblong. Heads rarely subsessile, nearly spherical, *in fruit ovate;* calyx half as long as pink corolla, lobes *thickened at base, nerveless, spinescent, stellate-spreading*, about as long as obconical tube, the lower longer — Spring — Weedy places and ditches; common.

Var. **tuberculatum,** Boiss. Leaflets oblong-linear. Calyx-lobes ciliate, hairs tubercled at base — Common.

18. T. Carmeli, Boiss. ⊙ .2 to .3, appressed-hairy; stems-ascending, forked. Free part of stipules *lanceolate-subulate;* leaflets *oblong-elliptical to oblong*, the upper acute. Heads long-peduncled, ovate-spherical, in fruit oblong; calyx half as long as cream-colored corolla, lobes *thick at base, nerveless*, subulate, plumose, the upper four not quite as long as the obconical tube, *the lower once and a half as long* — Spring — Dry and weedy places; Palestine, east and west of the Jordan

19. T. Alexandrinum, L. ⊙ *Bersîm.* .3 to .6, sparingly appressed-hairy; stem erect, branched. Free part of stipules lanceolate-subulate; leaflets oblong to lanceolate. Heads peduncled, sometimes subsessile, ovate, in fruit *oblong-conical;* calyx half as long as cream-colored corolla, lobes lanceolate-subulate, 3-*nerved at base*, at length spreading, as long as campanulate tube, the lowest one longer — Spring — Fields and grassy places; common.

Var. **phlœoides,** Boiss. Heads smaller, in fruit narrower, oblong — Beirût.

20. T. Panormitanum, Presl. ⊙ .3 to .5, sparingly appressed-hirsute; stems erect, thickish. Free part of stipules *long-subulate.* Heads oblong-ovate, in fruit oblong; calyx *hirsute*, shorter than *whitish* corolla, hairs tubercled at base, lobes lanceolate-subulate, 3-nerved at base, the lowest longer, *tube contracted at apex, oblong* — Spring — Moist fields; Beirût; Nusairy Mountains.

21. T. maritimum, Huds. ⊙ .2 to .5, sparingly hairy or glabrescent; stems erect or decumbent, branching. Free portion of stipules *linear*, acute; leaflets oblong-cuneate, obtuse. Heads sometimes sessile,

ovate; calyx more than half as long as white, or pale flesh-colored corolla, lobes lanceolate, somewhat 3-nerved, short, ciliate, tube *glabrous*, obconical, 10-grooved beneath, somewhat longer than the four upper, equal lobes, lower lobe longer — Summer — Fields ; coast.

22. T. plebeium, Boiss. ⊙ .1 to .15, puberulent, *hairs tubercled at base ;* stems diffuse. Free portion of stipules *short-lanceolate ;* leaflets *ovate, obtuse* .006 to .008 long. Heads short-peduncled, ovate, .01 long, in fruit compact ; calyx appressed-hirsute, one-third as long as *whitish-yellow* corolla, lobes lanceolate-subulate, the lowest longer, in fruit dilated, triangular-lanceolate, 3-nerved, tube deeply grooved, ovate, about as long as lobes — May — Between Rasheiyah and Damascus.

23. T. Alsadami, Post. (Journal Linnæan Society, Botany, XXIV., 425.) .1 to .15 hispidulous, hairs *not tubercled ;* stems erect or ascending. Free part of stipules *lanceolate* ; leaflets *oblong to obovate, cuneate at base*, .006 to .008 long. Heads subsessile or short-peduncled, ovate-spherical, .01 to .013 long, in fruit, ovate, compact ; calyx appressed-hirsute, one-third as long as white corolla, lobes lanceolate-subulate, in fruit *triangular-acuminate*, 3-nerved, the lowest longer, tube strongly ribbed and grooved, in fruit twice as long as lobes, *campanulate*, at length ovate, *contracted at apex* — Spring — Fields between Qureyah and el-Kufr (Haurân).

FIG. 111.



Calyx of T. Alsadami, magnified 4 diameters.

24. T. scutatum, Boiss. ⊙ .2 to .4, loose-hairy, erect and procumbent. Stipules membranous, violet-striped, free portion *leaflike, lanceolate;* leaflets *obovate*, sometimes retuse. Heads ovate, .015 long, in fruit oblong, .02 long, .013 broad, very compact and soon deciduous; calyx one-third as long as whitish-yellow corolla, lobes 3-5-nerved, lanceolate, the lowest twice as long as the others ; fruiting calyx dilated-obconical, deeply grooved, lobes *ovate-triangular, strongly reflexed* — Spring — Coast, and lower mountains ; common.

25. T. clypeatum, L. ⊙ *Bezâz-ul-Boqr*. 3 to .5, sparingly loose-hairy, procumbent. Stipules *dilated, half-ovate*, acute ; leaflets large, obovate, the upper mucronate, the lower retuse. Heads long-peduncled, in flower obovate, .03 long, .025 broad, in fruit ovate, *compact*, .03 long, .02 broad, soon deciduous ; calyx one-third as long as *pinkish-white* corolla, lobes *leaflike, lanceolate, the lower five times as long as the rest ;* fruiting calyx with four, dilated, spreading, many-nerved, ovate-triangular lobes, shorter than the grooved tube, and a *lower oblong-lanceolate lobe much longer than the others*, all strongly reflexed — Spring — Grassy places ; common. A showy species both in flower and fruit.

26. T. scabrum, L. ⊙ .1 to .5, appressed-hairy ; stems *stiff*, ascending or prostrate. Free part of stipules triangular-acuminate ; leaflets *leathery*, obovate-oblong. Heads solitary, ovate, tapering at base ; calyx longer than whitish corolla, lobes unequal, lanceolate, *rigid, spinescent-tipped*, 1-nerved, nearly as long as tube, *at length recurved ;* fruiting

FIG. 112.



Upper leaf and fruiting head of T. scabrum.

tube cylindrical — Spring — Dry, sandy places ; common.

27. T. compactum, Post. ⊙ .1, *densely appressed-hirsute,* branching from base, branches decumbent. Stipules membranous, the free portion lanceolate ; leaflets obovate-cuneate. Heads compact, solitary, axillary and terminal, oblong, .015 long, .008 broad in flower, .02 long .01 broad in fruit ; calyx *very hirsute, about as long as* pale flesh-colored corolla, teeth *triangular-lanceolate, one nerved,* nearly equal, as long as striate tube ; fruiting calyces imbricated — Spring — Aintâb.

28. T. subterraneum, L. ⊙ .3 to .4; stems sarmentous, prostrate. Stipules half-ovate, acute ; leaflets obcordate. Heads long-peduncled, in fruit globular, .005 broad, reflexed, appressed to ground ; corollate flowers 2-5, in one row ; calyx half as long as *white, pink-striped* corolla, lobes setaceous, ciliate, nearly as long as tube ; pod somewhat exserted from split calyx, obtriangular, crustaceous, netted, upper margin keeled, winged ; lobes of sterile calyces hairy, stellate-spreading — Spring — Weedy places ; Aleppo.

29. T. globosum, L. ⊙ *Neflet-Qutn.* .3 to .5, hirsute, diffuse. Stipules ovate, acute; leaflets obovate-cuneate to obcordate. Peduncles as long as leaves or a little longer, erect ; heads globular, ,01 to .015 in diameter; corollate flowers 5-6 in one row; calyx densely hirsute, shorter than *purple* corolla, lobes setaceous, somewhat shorter than tube; pod glabrous, membranous, obovate, included in calyx — Spring.

Var. **genuinum,** Post. Lobes of sterile calyces densely plumose, *not woolly* — Common in grassy places.

Var. **eriosphærum,** Post. Lobes of sterile calyces *densely-woolly ; heads pannous* — Less common than type. (*T. eriosphærum, Boiss.*)

Var. **Medusæum,** Post. Corollate flowers 2-4, the corolla twice as long as calyx. Pod reticulate at tip — Less common than type (*T. medusæum, Bl.*)

30. T. pilulare, Boiss. ⊙ .1 to .4, hairy ; stems slender, diffuse. Stipules ovate, *obtuse ;* leaflets small, wedge-obovate. Peduncles slender, at length somewhat longer than leaves, erect or spreading ; heads .006 to .01 broad, at length globular ; corollate flowers 1-2, calyx very hirsute, lobes setaceous, somewhat longer than tube, longer than the *small, white* corolla ; pod membranous, included in calyx, ovate, very obtuse ; calyx-lobes of sterile flowers at length long, flexuous, feathery — Spring — Shady and weedy places ; common.

Fig. 113.



Fruiting heads of T. pilulare.

31. T. fragiferum, L. ♃ *Hhandaqûq.* .1 to.3, glabrescent ; stems creeping. Stipules lanceolate, subulate at tip ; leaflets ovate, elliptical, obovate or obcordate, denticulate. Peduncles axillary, longer than leaves ; heads globular, .01 to .02 broad in flower and fruit, with a *many-fid involucre nearly as long as calyces ;* calyx one-third as long

as pink corolla, the upper two teeth in fruit bent inward, the lower three straight, nearly as long as tube ; pod ovate — Summer and Autumn — Moist places; northern Palestine to Marash, and northward, especially in middle and upper mountain regions.

Var. **modestum,** Post. Hairy or glabrous; Leaflets small, obovate to obcordate. Heads few-flowered, involucre short or 0 ; upper teeth of calyx straight — Alpine Lebanon and Antilebanon. (*T. modestum, Boiss.*)

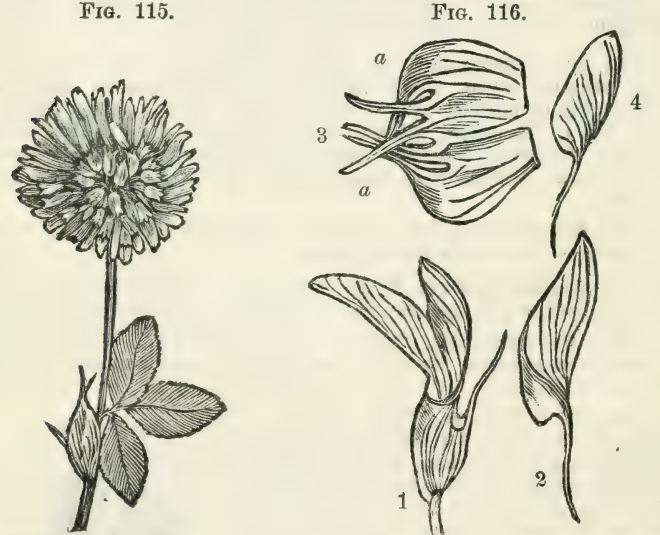
32. T. physodes, Stev. ♃ .2 to .5, glabrous; stems decumbent, not creeping. Free part of stipules lanceolate, long-setaceous ; leaflets ovate-elliptical to oblong, denticulate. Peduncles axillary and terminal, as long as or longer than leaf ; heads ovate-globular,

FIG. 114.



Fruiting head of T. fragiferum.

FIG. 115. FIG. 116.



Leaf and flowering head of T. physodes.

(1) Flower of T. Germaniciæ. (2) One of the wings. (3) Calyx spread open showing the commencement of the Galea, with the patches of minute puberulence, *a a*, represented by the shading. (4) The keel.

.02 to .025 long, *not involucrate ;* calyx *villous,* half as long as pink corolla, the upper two teeth in fruit *broader, lanceolate,* declined, the lower three awl-shaped, straight, somewhat longer than tube ; pod oblong — Summer — Lebanon to Aintâb, and northward.

Var. **psilocalyx,** Boiss. Calyx even in fruit, glabrous or slightly hairy at back — Common.

33. T. Germaniciæ, Post. ♃ .1, glabrous, or stems sparingly hairy above ; stems ascending. Free portion of stipules lanceolate, setaceo-caudate ; leaflets firm, ovate-rhombic, spinulose dentate, the

lower retuse. Heads spherical, .015 in diameter, solitary, peduncled, peduncles about as long as leaves; calyx *glabrous, except at upper part of galea which is furnished with minute, microscopic, glandular hairs,* (*a* Fig. 116), teeth 3-nerved, all *subulate*, nearly as long as tube, the upper two declined, the lower three straight ; corolla purplish, about twice as long as calyx — Summer — Marash. A. subspeices of T. physodes, Stev., described from immature specimens.

34. T. resupinatum, L. ⊙ .3 to .5, glabrous; stems diffuse or ascending. Stipules triangular-lanceolate, *long-tapering.* Peduncles about *as long as or longer than leaves;* heads .01 in diameter in flower, and .015 in fruit ; flowers nearly sessile, recurved; calyx *one-half to one-third as long as purple corolla,* in fruit *villous, the back spreading out into a forked, two-awned cone,* the lower three teeth broader, lanceolate ; pod ovate, compressed, obliquely mucronulate — Spring — Grassy places; common. Varies much in thickness of stems and size of flowers.

Fig. 117.



Upper leaf and fruiting head of T. resupinatum.

35. T. tomentosum, L. ⊙ .1 to .5 glabrous; stems diffuse. Stipules ovate-lanceolate. *Peduncles shorter than leaves, sometimes* 0 ; heads .005 broad in flower, .01 to .015 in fruit ; flowers nearly sessile; calyx two-thirds as long as pink corolla, in fruit densely pannous, teeth *linear-subulate, hidden by wool,* the upper deflexed; pod ovate, compressed — Spring — Moist, grassy places; common.

36. T. bullatum, Boiss. et Haussk. ⊙ .1 to .3, glabrous ; stems diffuse. Stipules lanceolate, *acuminate.* Peduncles filiform, somewhat longer than leaf or shorter, at length nodding ; flowers subsessile ; calyx half as long as pink corolla, in fruit woolly, the upper teeth very small, *short-triangular*, the lower twice as long, *oblong-lanceolate ;* pod ovate, compressed — Spring — Fields; between Aleppo and Aintâb.

Var. **glabrescens,** Post. Fruiting calyx sparingly villous or glabrescent — Besaba (Lebanon) among pine trees ; 'Abeih; Nahr-el-Kelb.

Fig. 118.



Fruiting head of T. spumosum.

37. T. spumosum, L. ⊙ .2 to .4, glabrous; stems ribbed, erect or diffuse. Stipules *ovate*, scarious, setaceous-caudate ; leaflets obovate, .02 to .03 long, denticulate, the lower truncate. Heads peduncled or involucrate, *globular, in fruit ovate,* .035 long, .03 broad ; calyx 20-nerved, reticulate, *in fruit ovate,* lobes lanceolate-subu-

late, at length recurved ; *standard acute* — Spring — Grassy places ; common.

38. T. Aintabense, Boiss. et Haussk. ⊙ .2 to .4, glabrescent, diffuse. Free part of stipules *lanceolate*, setaceous-caudate ; leaflets *elliptical-obovate*, .01 long, serrulate. Heads ovate, peduncled, in fruit oblong, .02 long; calyx cylindrical, *in fruit oblong*, 36-40-nerved, lobes lanceolate-subulate; *standard obtuse* — Summer — Grassy places; Nusairy Mountains to Cassius, Aintâb, and Marash.

39. T. xerocephalum, Fenzl. ⊙ .15 to .4, glabrescent; stems diffuse. Free part of stipules lanceolate-subulate ; leaflets .01 long, wedge-obovate to oblong, serrulate, mucronulate. Heads short-peduncled, involucrate at base, globular, .006 to .01 in diameter, in fruit oblong to oblong-cylindrical, dense ; calyx-lobes lanceolate-subulate, tube in fruit *pyriform-turbinate*, .002 to .003 long, .001 broad, about 36-nerved, *marked by two, villous, longitudinal lines ;* petals obtuse — May and June — Grassy places; common.

40. T. glanduliferum, Boiss. ⊙ .3 to .4, glabrous ; stems erect, zigzag. Stipules half-ovate, connate, *glandular-serrate ;* leaflets nerved, obovate to oblong and oblong-linear, *glandular-serrate.* Peduncles long; heads globular, *involucre* minute *or* 0; calyx-lobes one-third as long as pink corolla, subulate, glandular at base ; beak as long as pod — Spring — Fields ; Jerusalem to Nabatîyeh. Too near the next.

41. T. nervulosum, Boiss. et Held. ⊙ .3 to .4, glabrous; stems erect or decumbent. Stipules half-ovate, connate, *dentate-fringed, not glandular ;* leaflets nerved, oblong-linear, denticulate, sometimes obscurely and irregularly lobed, *not glandular.* Peduncles long ; heads ovate, *involucre* 0 ; calyx-lobes less than half as long as pink corolla, subulate, *not glandular at base ;* beak as long as pod — Spring — Fields.

FIG. 119.



Head and leaf of T. nervulosum.

Var. **Galilæum,** Boiss. Heads nearly globular. Sinus of calyx sometimes furnished with 1-2 hairs ; teeth longer than tube — Banias ; Galilee.

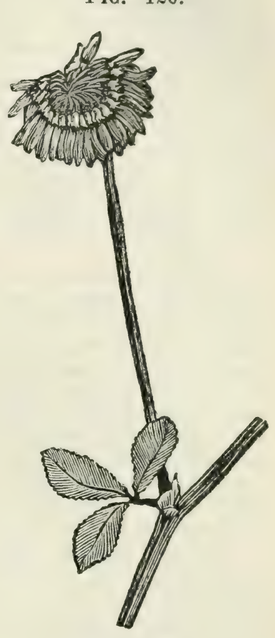
42. T. glomeratum, L. ⊙ .1 to .2, glabrous ; stems erect and diffuse. Stipules ovate-caudate ; leaflets small, wedge-obovate, spiny-serrulate. Heads *sessile*, at length globular, .006 broad, axillary and terminal, involucrate by opposite leaves ; pedicels very short ; calyx two-thirds as long as pink corolla ; teeth equal, ovate-acuminate, *auricled at base*, at length spreading, shorter than ovate, 10-nerved tube — Spring — Subalpine Lebanon, between Dimân and Hadeth.

43. T. nigrescens, Viv. ⊙ .3 to .5, glabrous ; stems decumbent or ascending, *hollow.* Stipules *ovate, abruptly cuspidate ;* leaflets obovate, often truncate, denticulate at apex. Heads nearly globular, .01 to .015 in diameter ; calyx about half as long as *white* corolla, lobes

lanceolate-subulate from a broad, *three-nerved base*, the upper ones nearly as long as tube ; pod linear, straight, longer than calyx-tube, 4-seeded, lower margin crenate — Spring – Grassy places ; Beirût.

44. T. Petrisavii, Clem. ⊙ .3 to .6, glabrous ; stems decumbent or ascending, *solid*. Free part of stipules *triangular lanceolate-setaceous ;* leaflets obovate, often truncate, denticulate at tip. Heads nearly globular, .015 to .02 in diameter ; calyx two-thirds as long as *pale pink* corolla, lobes lanceolate, somewhat *one-nerved*, narrowly white-margined, the upper one nearly as long as tube ; pod *constricted between the* 2 *seeds* — Spring — Grassy places ; common.

Fig. 120.



Head of T. Petrisavii.

45. T. Meneghinianum, Clem. ⊙ .3 to .6, glabrous ; stems ascending, thick, hollow. Free part of stipules triangular, tapering-setaceous ; leaflets obovate, spiny-dentate from middle. Heads nearly globular, .015 to .02 in diameter ; calyx somewhat more than half as long as white corolla, lobes lanceolate-subulate, the upper ones as long as tube ; ovary constricted between ovules ; pod *one-seeded* — Spring — Fields ; common. Too near the last.

46. T. repens, L. ♃ .1 to .4, glabrous ; stems prostrate, rooting. Leaflets *large, obovate to orbicular, serrulate ;* stipules abruptly cuspidate from a broad, scarious base. Heads nearly globular, .02 to .04 in diameter ; calyx half as long as white corolla, lobes lanceolate, the upper two as long as tube ; pod sessile, linear, obtuse ; seeds 3-4 — Spring and summer — Grassy places ; common.

Var. **Orphanideum,** Boiss. Dwarf. Leaflets minute, often obcordate. Peduncles short. Corolla pale pink — Roueissât (Lebanon).

47. T. rhytidospermum, Boiss. et Hoh. ♃ .1 to .2, stems ascending, appressed-hairy. Stipules lanceolate-linear ; leaflets obovate-oblong to oblong, obtuse. Peduncles 2-∞ times as long as leaves ; heads globular, .015 in diameter, at length oblong ; pedicels shorter than calyx-tube ; upper pair of calyx-teeth very short, triangular, the lower three linear, ciliate, longer than tube ; corolla *yellowish-flesh-colored* — Summer — Berytdagh and probably Akherdagh.

Fig. 121.



Flowering head of T. comosum.

48. T. comosum, Lœlill. ⊙ .2, glabrous *except inflorescence;* stems branching from base, ascending. Stipules oblong-lanceolate, acute; leaflets cuneate, oblong-linear, obtuse. Peduncles loosely hirsute, longer than leaf; *spike cylindrical* .03 long, .008 broad; pedicels nearly as long as very short calyx-tube; upper two calyx-teeth triangular, very short, the lower three linear-lanceolate, obtuse, twice as long as tube; corolla *pale flesh-color* — Spring — Sandy places; Beirût; rare.

49. T. stenophyllum, Boiss. ⊙ .1 to .15, appressed pubescent; stems ascending from neck. Stipules triangular-lanceolate, the upper acuminate; leaflets *small*, obovate to oblong, and linear. Peduncles twice to thrice as long as leaves; heads *ovate, at length oblong*, .03 long, .01 broad; pedicels one-third to one-half as long as calyx-tube; calyx 2-lipped, the upper two teeth short-triangular, the lower long-linear; corolla *pink; standard oblong-spathulate* — Spring; sands near Gaza.

50. T. speciosum, Willd. ⊙ .1 to .2, appressed-hirsute, erect. Stipules half-ovate to oblong, acute; leaflets elliptical-oblong, cuneate at base, the lower retuse. Peduncles slender, twice to thrice as long as leaf. Heads ovate, loose, .03 long, .02 broad; pedicels somewhat longer than calyx-tube; the upper two calyx-teeth triangular, shorter than tube, the lower three lanceolate, obtuse, twice as long as tube; standard *obovate-orbicular, violet*, much longer than *white wings and keel* — Spring — Fields; rare.

Fig. 122.



Leaf and flowering head of T. speciosum.

51. T. erubescens, Fenzl. ⊙ .3 to .5, appressed-hairy; stems *filiform, ascending or decumbent.* Stipules oblong, acute; leaflets obovate-oblong. Peduncles slender, twice to thrice as long as leaves; heads globular, .01 to .013 in diameter; pedicels somewhat shorter than calyx-tube; upper calyx-teeth triangular, as long as tube or shorter, lower linear-subulate, twice or thrice as long as tube; corolla *pink*, standard *oblong-spathulate*, longer than wings and *violet* keel — Spring — Rocky places; common.

52. T. Boissieri, Guss. ⊙ .2 to .3, *hirsute with spreading* hairs, erect. Stipules lanceolate-subulate; leaflets elliptical, the lower retuse. Peduncles scarcely longer than leaves, often shorter; heads ovate, .015 long; pedicels as long as calyx-tube; upper calyx-teeth triangular, somewhat shorter than tube, lower lanceolate-subulate, twice as long; corolla thrice as long as calyx, *cream-colored*, standard obovate, longer than wings — Dry hills; Gilead to Galilee, Antilebanon, Antioch, Marash, and northward.

53. T. agrarium, L. ⊙ .3 to .4, sparingly pubescent, erect or ascending. Stipules ovate, tapering; leaflets obovate to *oblong-rhomboid*, sometimes retuse. Peduncles as long as or longer than the leaves; heads ovate, dense, .01 to .015 long; pedicels *somewhat shorter* than

calyx-tube; upper calyx-teeth triangular, lower linear, somewhat longer than tube; corolla *yellow;* standard *round-obovate* — Spring and summer — Common everywhere.



FIG. 123.

Leaf and head of T. agrarium.

Var. **subsessile,** Boiss. Peduncles short or almost 0.

54. T. Lagrangei, Boiss. ⊙ .1 to .2, sparingly appressed-puberulent, erect or ascending. Stipules ovate-oblong, tapering; leaflets obovate to obovate-oblong, retuse. Peduncles shorter than leaves or as long; heads nearly globular; pedicels one-third to one-half as long as calyx-tube; upper calyx-teeth shorter than tube, lower *subulate*, twice as long as tube; corolla *reddish-violet*, thrice as long as calyx; *standard obovate* — Spring — Marash.

55. T. procumbens, L. ⊙ .3 to .4, loosely puberulent, diffuse or erect. Stipules ovate, acute; leaflets obovate, retuse. Peduncles filiform, straight, longer than leaves; heads *hemispherical, at length globular*, .005 to .01 broad; pedicels *half as long* as calyx-tube; upper calyx teeth triangular, half as long as tube, lower *lanceolate-subulate*, somewhat longer than tube; corolla *yellow;* standard oblong — Spring — Grassy places; Aintâb, and northward.

18. ANTHYLLIS, L. ANTHYLLIS.

Calyx tubular, 5-toothed, marcescent, sometimes inflated. Petals long-clawed. Stamens monadelphous. Ovary 2-∞ -ovuled. Pod ovate, 1-seeded, more or less coriaceous — Annual or perennial herbs, without stipules, with capitate flowers, the lower leaflets of the pinnate leaves not stipule-like.

A. vulneraria, L. ♃ ⊙ .2 to .5, usually appressed-hirsute. Lower leaves simple or of two pairs, the terminal leaflet ovate to oblong, much larger, the upper leaves of 3-6 pairs of oblong-linear, nearly equal leaflets. Heads solitary or twin, axillary subsessile, or terminal long peduncled, involucrate by two, digitate leaves; fruiting calyx oblong-ovate — Spring — Nusairy Mountains, and northward.

19. PHYSANTHYLLIS, L. PHYSANTHYLLIS.

Calyx tubular with straight mouth, 5-toothed, at length bladdery-inflated. Petals long-clawed. Stamens diadelphous. Ovary 2-ovuled. Pod parchment-like, tapering into a stalk, constricted between seeds, 2-celled — Annual herbs.

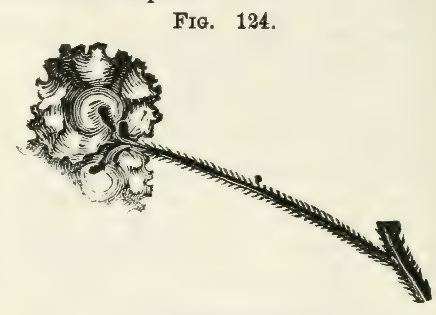
P. tetraphylla, L. ⊙ .4 to .6, appressed-villous; stems prostrate, nearly simple. Leaves odd-pinnate, the terminal leaflets obovate, much larger than the lateral, .03 long. Heads axillary, few-flowered, nearly sessile; flowers nearly sessile; fruiting calyx .02 long, .01 broad; pod villous, seeds tubercled — Spring — Fields; common.

20. HYMENOCARPUS, Sav. Hymenocarpus.

Calyx tubular, deeply and equally 5-fid. Petals free, short-clawed, keel beaked. Stamens diadelphous. Ovary 2-ovuled. Pod stipitate, circinnate, flat, 2-celled by means of a transverse partition, indehiscent, its outer margin broad-winged — Annual herbs, with aspect of Medicago, the lower leaves destitute of stipules.

H. circinnatus, L. ⊙ .3 to .6, villous, ascending or diffuse. Lower leaves entire, oblong-spathulate, the others sessile, with 2-4 pairs of leaflets, the terminal larger. Heads peduncled, 2-4-flowered ; calyx-teeth linear, longer than tube ; pod round, appressed-hairy, wing broader than cell, with a network of raised veins and a crenate, prickly margin — Spring — Grassy places ; everywhere.

Fig. 124.



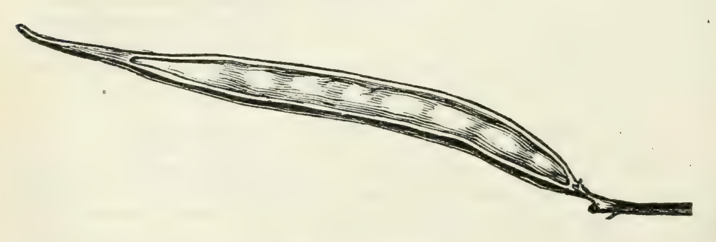
Pod of H. circinnatus

21. SECURIGERA, DC. Securigera.

Calyx short-campanulate, somewhat 2-lipped, upper teeth connected higher up than lower. Keel tapering-beaked. Pod elongated-linear, beaked, flattened, nearly indehiscent, margin thickened on both sides, space between seeds somewhat constricted, not separating into joints — Annual herbs, with aspect of Coronilla.

S. Coronilla, DC. ⊙ .4 to .6, glabrous, erect or diffuse. Leaflets 5-7 pairs, cuneate, truncate or retuse. Peduncles longer than leaves, 6-8-flowered, in fruit much elongated; flowers yellow; pods papillary between margins; beak hooked — Spring — Fields and grassy places; common.

Fig. 125.



Pod of S. Coronilla.

22. CYTISOPSIS, Jaub. et Sp. Cytisopsis.

Calyx tubular, bilabiate, the upper lip a little longer, bifid, the lower 3-parted. Petals long-clawed, the lower 4 adnate to stamen-tube. Stamens diadelphous. Ovary ∞-ovuled. Pod woody, cylindri-

cal, straight, at last 2-valved, partitioned between seeds — Low shrubs, with digitate leaves.

C. dorycniifolia, Jaub .et Sp. ♄ .2 to .6, diffuse, much branched, appressed-silvery-silky. Leaves sessile on a little, sheath-like cushion; leaflets 5-7, linear-spathulate, obtuse. Flowers 1-3, nearly sessile, 2-bracted, yellow; calyx-teeth much shorter than .015 long tube; pod silky, .02 long, .004 broad — Spring — Dry, schistose rocks; middle zone of Lebanon to Nusairy Mountains, Cassius, Amanus, and northward. Rather rare.

23. DORYCNIUM, Tourn. Dorycnium.

Calyx 5-fid or 2-lipped. Wings connivent in front, or coalesced, furnished with a longitudinal fold or a transverse, inflated projection. Keel obtuse. Stamens diadelphous. Style gradually tapering at apex. Pod ovate, oblong, or linear — Perennial herbs or shrubs, with capitate flowers.

* *Flowers .01 or more in length.*

1. D. hirsutum, L. ♄ .3 to .5, villous-hirsute; branches terete or erect. Leaves nearly sessile, leaflets wedge-obovate. Peduncles longer than leaves; *involucre 3-4-leaved;* calyx-lobes lanceolate-subulate, somewhat longer than tube; standard linear-spathulate, much longer than wings and keel; pod oblong, turgid, .007 long, .004 thick, acutish, about as long as calyx — Spring — Shrubby places; Lebanon and Antilebanon to Marash, and northward.

Var. **Syriacum,** Boiss. Sparingly hairy. Pod ovate-oblong, as long as calyx — Cassius and Amanus.

Var. **rhombifolium,** Post. Leaflets obovate-rhomboid, acuminate — Woods; Cassius.

* * *Flowers .005 or less in length.*

2. D. rectum, L. ♃ .6 to 1, appressed-pubescent; stems angled, herbaceous, erect, branched. Leaves petioled, leaflets glaucous below, the stipular *ovate,* longer than petiole, the others *wedge-obovate.* Peduncles twice as long as leaves; flowers .004 long, crowded; calyx-lobes subulate, twice as long as tube; standard a little longer than wings and keel; pod *slender, cylindrical,* .01 long, .0015 thick, thrice as long as calyx, straight, acute, shining — Summer — Bushy places; Lebanon and Cœlesyria to Amanus, and northward.

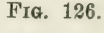
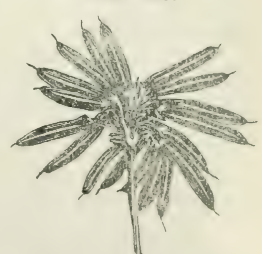


Fig. 126.



Pods of D. rectum.

3. D. Kotschyi, Boiss. et Reut. ♃ .6 to 1, villous; stems terete, branching. Leaves short petioled, leaflets *obovate-oblong.* Peduncles somewhat longer than leaf; flowers minute, pedicel longer than calyx-tube; calyx-lobes, *lanceolate-subulate,* somewhat shorter than tube; standard longer than wings and keel; pod oblong, *turgid,* .005 long, .002 to .003 thick, obtuse, mucronate, twice and a half as long as calyx — Summer — Amanus.

4. D. Haussknechtii, Boiss. ♄ .2 to .1, shrubby at base, appressed-silky ; stems ascending or erect. Leaves sessile, leaflets *linear-oblong*, acute. Peduncles long ; pedicels as long as calyx-tube ; calyx-lobes *triangular*, half as long as tube, the upper somewhat broader ; pod *oblong*, .005 long, .002 to .003 thick, acute, twice as long as calyx, 1-seeded — Summer — Amanus, and northward.

Var. **Libanoticum,** Boiss. Branches short, prostrate. Heads few-flowered, calyx-tube twice and a half as long as teeth ; pods .003 long, .002 thick — Subalpine and alpine Lebanon.

24. LOTUS, L. Lotus.

Calyx 5-fid, rarely 2-lipped. Keel beaked, gradually or abruptly recurved. Style tapering at tip. Pod oblong or linear, bivalved, wingless, often septate between seeds — Herbs or shrubs, lower leaflets near stem, stipule-like, rarely 0.

* *Calyx tubular-campanulate. Pod oblong or linear.*

† *Perennials.*

‡ *Flowers yellow.*

1. L. Creticus, L. ♃ .2 to .5, shrubby at base, silky, or more or less appressed-canescent, prostrate or ascending, naked at base. Leaves sessile or short-petioled ; leaflets wedge-obovate to wedge-oblong. Peduncles 1-8-flowered, long ; calyx-lobes *oblong-lanceolate*, acute, the lateral shorter ; standard round-obovate, longer than the *gradually curved keel ;* wings shorter than keel ; pod glabrous, cylindrical-flattened, .02 to .04 long seeds *globular* — Spring —

Var. **genuinus,** Boiss. *Silvery-silky.* Leaflets oblong to linear-cuneate — Philistine coast.

2. L. cytisoides, L. ♃ .2 to .5, canescent with appressed hairs, not silky, prostrate or ascending. Leaves sessile or short-petioled, leaflets oblong-obovate. Peduncles 2-5-flowered ; pod linear-flattened, .02 to .04 long, *torulose ;* seeds *ovate* — Spring — Sandy places along coast, and interior.

3. L. corniculatus, L. ♃ *Kuteihah* .2 to .4, glabrous or sparingly hairy ; stems ascending. Petiole shorter than obovate or oblong leaflets. Peduncles thick, 3-5-flowered, much longer than leaf ; calyx-lobes *subulate from a triangular base*, equal, nearly as long as tube ; petals *turning greenish in drying*, standard orbicular, wings broad-obovate, lower border strongly recurved, keel *bent downward at a right angle ;* pod glabrous, straight, terete, .02 to .05 long — Summer —

Var. **ciliatus,** Boiss. Leaflets and calyces ciliate with long hairs — Sidon ; subalpine and alpine Lebanon.

Var. **alpinus,** Boiss. usually low. Leaves subsessile, leaflets minute. Calyx-lobes shorter and broader than in type — Alpine and subalpine Lebanon and northward.

4. L. tenuifolius, Rchb. ♃ .5 to 1, glabrous or somewhat hirsute, procumbent. Leaves short-petioled, leaflets *linear-obovate to linear.* Peduncles slender, 1-5-flowered, many times longer than leaf ; calyx-lobes triangular-subulate, nearly equal, almost as long as tube ; standard orbicular, wings oblong-obovate, the lower margin straight-

ish; keel bent below at a right angle; pod .02 to .03 long, straight, terete — Spring and summer — Moist meadows and by water courses; common.

Var. **uniflorus,** Boiss. Stems short; peduncles 1-flowered — Lebanon; Cœlesyria.

5. L. lamprocarpus, Boiss. ♃ .6 to 1, *hispid*, grey, diffusely branched. Petioles shorter than the *ovate*, acutish leaflets. Peduncles slender, twice to thrice as long as leaf, 2-4-flowered; flowers small; calyx-lobes lanceolate-subulate, twice as long as tube, a little shorter than corolla; standard obovate, wings oblong-linear, keel *gradually curved;* pods glabrous, *shining grey*, straight, .02 long, 3-4 times as long as calyx- — Summer — Moist places, especially in mountains; Jordan Valley; Dead Sea.

‡ ‡ *Flowers pink or purple*, .01 *to* .015 *long.*

6. L. Gebelia, Vent. ♃ .3 to .6, glaucescent; stems ascending, flexuous, much branched. Petioles shorter than stipular leaves; leaflets wedge-obovate, mucronulate. Peduncles from upper axils, 2-6-flowered; calyx-lobes triangular-lanceolate to lanceolate-subulate, as long as tube; corolla *pink*, .015 long, standard *obovate*, much longer than broad wings and curved purple-tipped keel, which are about of equal length; pod .02 to .04 long, keeled, somewhat flattened, often torulose, 3-4 times as long as calyx — Spring and summer — Mountains and interior plains; common. A very variable species.

Var. **genuinus,** Boiss. Glabrous.

Var. **villosus,** Boiss. Villous.

Var. **Libanoticus,** Boiss. Woolly or pannous. Flowers smaller than in type.

Var. **Haussknechtii,** Boiss. Tomentellous. Flowers small. Calyx-lobes shorter than tube — Damascus.

7. L. lanuginosus, Vent. ♃ .3 to .5, *tomentellous;* stems prostrate, branching, densely leafy. Petiole *much shorter than minute, obovate, often obcordate*, leaflets. Peduncles 1-3-flowered, twice to four times as long as leaf; calyx-lobes lanceolate-subulate, almost as long as tube; corolla *intensely purple;* standard *oblong-linear*, much longer than the angled or curved keel; wings somewhat shorter than keel — Spring — Et-Tîh; Syrian desert.

† *Annuals.*

‡ *Flowers pink, purple, or whitish.*

8. L. Arabicus, L. ⊙ *Khuddeirah. Qabd. Jeddûb.* .3 to 1, sparingly appressed-hairy, glaucescent; stems prostrate or ascending, much branched. Leaves very short-petioled, leaflets wedge-obovate, obtuse. Peduncles 3-5-flowered, *nearly twice as long as leaf;* calyx-lobes linear-lanceolate, somewhat longer than tube; flowers .003 to .01 long; corolla pink; standard obovate, nearly twice as long as calyx; keel bent at an *obtuse angle;* pod straight, .02 to .03 long, glabrous, terete, 4-5 times as long as calyx — January to March — Arabia Petræa.

9. L. glinoides, Del. ⊙ Qadb. .05 to .2, appressed-canes-

cent, prostrate. Leaves short-petioled ; leaflets obovate, tapering at base. Flowers axillary, *nearly solitary*, *very short-peduncled*, .005 long; calyx half as long as pink corolla, lobes lanceolate, nearly as long as tube; standard obovate, keel bent at a right angle; pod slender, .02 long, *somewhat incurved* and flattened, *torulose*, 5-6-times as long as calyx — Spring — Sinai to Egypt.

10. L. Conimbricensis, Brot. ⊙ .2 to .3, glabrous or sparingly hirsute ; stems slender, erect or ascending. Petioles shorter than ovate, stipular leaflets; leaflets obovate to rhombic. Peduncles axillary, 1-2-flowered, thickish, *shorter than calyx;* flowers .008 long; calyx two-thirds as long as whitish corolla, lobes lanceolate-subulate, longer than tube ; standard ovate, pink-striped, keel bent at a right angle ; pod slender, .07 long, terete, acute, *usually semicircular* — Spring — Wet meadows; Tripoli; Hhûleh.

11. L. augustissimus, L. ⊙ .2 to .3, *sparingly hirsute*, decumbent or ascending. Leaves short-petioled ; leaflets of lower leaves obovate, of upper oblong, acute. Peduncles filiform, twice as long as leaf, 1-2-flowered; calyx-lobes *lanceolate-subulate*, longer than tube; corolla once and a half as long as calyx, keel obtuse-angled ; pod .02 to .03 long, *slender*, straight, terete, acute, 5-7 times as long as calyx — Spring — Fields, especially near coast.

12. L. parviflorus, Desf. ⊙ .1 to .3, *villous*, erect or ascending, much branched. Petiole short ; stipular leaves ovate, *semicordate*, the others oblong-lenticular. Peduncle 2-6-flowered, twice as long as leaf, flowers .007 long ; calyx-lobes *plumose*, *linear-setaceous*, *twice as long as tube*, *nearly as long as corolla ;* standard obovate, keel obtuse-angled ; pod *oblong*, .01 long, *a little longer than calyx* — Spring —

Var. **macrolobus,** Post. Pod linear, .02 long, *thrice as long as calyx* — Beirût.

* * *Calyx* 2-*lipped. Pod linear, cylindrical or flattened.*

13. L. peregrinus, L. ⊙ .1 to .4, appressed-hairy or silky, diffuse. Leaflets obovate-cuneate, *obtuse*, stipulars ovate. Peduncles shorter than leaf or as long, 2-4-flowered, at length thickened ; keel narrow, boat-shaped ; pod straight, .02 to .05 long, .002 broad, obtuse, mucronate, scarcely torulose — Spring — Fields and grassy places ; common.

Var. **acutifolius,** Post. Leaflets more or less acute. Pods thick, .003 in diameter — Beirût.

Var. **Carmeli,** Post. Peduncles usually 1-flowered, twice as long as leaf. Pods .003 in diameter — Carmel. (*L. Carmeli*, *Boiss.*)

14. L. pusillus, Viv. ⊙ .2 to .3, appressed-tomentellous. Leaflets *minute*, obovate-oblong, stipulars ovate. Peduncles twice to thrice as long as leaf, slender, 1-2-flowered ; corolla once and a half as long as calyx, .008 long, keel boat-shaped; pods .02 to .03 long, slen-

FIG. 127.



Pods of L. pusillus.

der, somewhat flattened and torulose, obliquely mucronate — Spring —

Var. **major,** Boiss. All the parts somewhat larger than in type. Peduncles often 3-4-flowered — Sandy places ; coast.

Var. **macranthus,** Boiss. Corolla .01 long ; otherwise as in last — Beirût.

15. L. ornithopodoides, L. ⊙ .3 to .5, appressed-pubescent, diffuse. Leaflets obovate to rhombic. Peduncle longer than leaf, 3-5-flowered ; corolla .01 long, keel boat-shaped ; pod .04 long, .002 broad, *much flattened, torulose,* slightly curved — Spring — Fields ; common.

* * * *Calyx campanulate. Pod thick, longitudinally 2-celled by inflexion of upper suture.*

16. L. edulis, L. ⊙ .2 to .4, *villous-pubescent,* ascending or diffuse. Stipulars cordate-ovate ; leaflets wedge-obovate. Peduncles 1- rarely 2-flowered, twice to thrice as long as leaves ; calyx-lobes lanceolate-linear, twice as long as tube ; corolla .015 long, standard round, keel gradually curved ; pod *curved,* .03 to .04 long, .005 thick, *mucronate-hooked* — Spring — Fields ; common along coast.

25. TETRAGONOLOBUS, Scop. Tetragonolobus.

Calyx 5-fid. Keel beaked, curved downward. Stamens diadelphous. Style thickened above, stigma tapering. Pod cylindrical, the nerves of the sutures dilated into wings — Herbs with aspect of Lotus.

T. purpureus, Mœnch. ⊙ *Asabi'-el-'Arûs.* .3 to .5, hirsute ; stems ascending. Stipulars adnate to petiole ; leaflets large, ovate rhombic. Peduncle 1-2-flowered, longer than leaf ; calyx-lobes lanceolate ; corolla .02 long, purple, once and a half as long as calyx ; wings of pod wavy, broad — Spring —

Var. **Palæstinus,** Post. Peduncle shorter than leaves ; calyx-lobes linear ; wings of pod narrow, slightly wavy — Fields ; commoner than type. (*T. Palæstinus, Boiss.*)

Fig. 128.



T. purpureus, Var. Palæstinus.

26. PSORALEA, L. Psoralea.

Calyx campanulate, 5-lobed. Petals nearly of equal length ; keel obtuse. Ovary 1-ovuled, style filiform, stigma capitellate. Pod 1-seeded, indehiscent, the pericarp usually adherent to the seed — Glandular-dotted herbs or shrubs, with trefoil leaves and racemed or capitate, (in ours) violet flowers.

1. P. Jaubertiana, Fenzl. ♃ .6 to 1, appressed-canescent ; stems thick at base, indurated, ascending. Leaflets of *all the leaves round to ovate from a rounded to wedge-shaped base, remotely repand-toothed. Racemes* axillary, much longer than leaves, .1 to .15 long, rather loose ; flowers .007 long, 3-5 in a whorl ; calyx-teeth *triangular-lanceo-*

late, shorter than tube ; pod included in calyx, ovate, .005 long, beakless — June — Clayey fields ; Antioch to Aleppo, Aintâb, and north-eastward.

2. P. bituminosa, L. ♃ *'Uweineh. 'Awarîneh.* .6 to 1, appressed-hirsute, erect. Leaflets *nearly entire*, those of lower leaves ovate, obtuse, of upper *oblong-lanceolate to linear-lanceolate, acute.* Peduncles axillary, longer than leaf ; *heads dense, involucrate, becoming elongated into whorled racemes in fruit ;* flowers .02 long ; calyx-lobes *subulate*, longer than tube ; pod hirsute, ovate, flattened, *ending in a sword-shaped, smooth or roughened, exserted beak* — Spring and early summer — Sterile places ; common throughout.

27. INDIGOFERA, L. Indigo-Plant. *Ssabâgh. Nîl.*

Calyx short, obliquely 5-toothed. Standard obtuse. Keel gibbous or spurred on each side. Connective of anthers ending in a gland or mucro. Ovary 1-∞-ovuled, style filiform, stigma capitate. Pod 2-valved, various in shape, partitioned between seeds — Herbs or shrubs, with appressed hairs inserted by their middle, and with pinnate leaves, and flowers in axillary racemes.

1. I. Arabica, Jaub. et Sp. ♄ .3, *silky-strigulose.* Leaflets 2-3 pairs, oblong-obovate, mucronulate. Racemes short-peduncled, shorter than leaves; flowers .003 long, scarlet ; pods deflexed, oblong, .005 to .01 long, .004 to .006 broad, straight, flat, abruptly cuspidate, 2-5-seeded, valves keeled — Spring — Sinai.

2. I. paucifolia, Del. ♄ *Widmeh.* .3 to .6, appressed-grey-puberulent, erect, branching. Leaves *simple*, or composed of 2-5, oblong-lanceolate, somewhat conduplicate leaflets. Racemes *much longer than leaf;* pods deflexed, *linear*, .02 to .025 long, .002 thick, *torulose*, mucronate, 6-8-seeded — Spring — South end of Dead Sea.

3. I. argentea, L. ♄ *Nîleh. Ssabâgh.* .5 to 1, appressed-silvery-white, erect. Leaflets 2-3 pairs, obovate, obtuse. Racemes rather loose, *shorter than leaf ;* pods *slightly* deflexed, oblong, .01 to .014 long, .003 thick, necklace-like, 3-4-seeded — August and September — Jordan Valley, and southward to Egypt. Cultivated for Indigo.

28. GALEGA, L. Galega.

Calyx bell-shaped, 5-toothed. All the stamens connate in a closed tube, anthers muticous. Ovary sessile, many-ovuled, style filiform, stigma capitate. Pod linear, nearly terete, with parallel nerves converging toward the middle of the valves — Perennial herbs, with odd-pinnate leaves, and axillary and terminal racemes.

G. officinalis, L. ♃ Goat's Rue. .6 to 1, or more, glabrous, stem wavy. Leaflets 5-8 pairs, oblong to oblong-lanceolate, mucronate. Racemes rather dense, longer than leaf; calyx-lobes subulate from a triangular base, longer than tube ; corolla .01 long, bluish ; pods linear, .04 long, .002 thick, torulose, tapering at tip — Summer — Aleppo, and north-eastward.

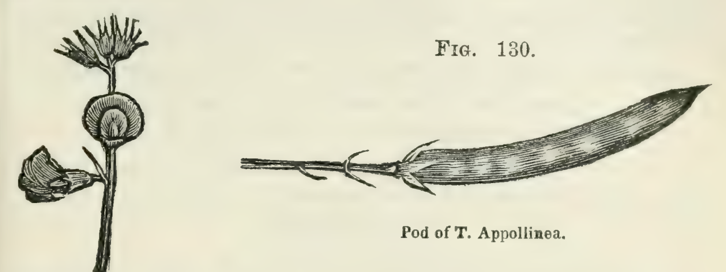
Var. **albiflora,** Boiss. Flowers *white* — Shetoorah (introduced).

29. TEPHROSIA, Pers. Hoary Pea.

Calyx bell-shaped, nearly equally 5-toothed. Standard broad, silky, keel obtuse. Stamens monadelphous, the vexillar filament at length free almost to base. Ovary 2-∞-ovuled, stigma glabrous or bearded. Pod linear, flattened, bivalved, seeds flattened — Shrubs, with odd-pinnate leaves, and racemes opposite the leaves.

Fig. 129.

Fig. 130.



Pod of T. Appollinea.

Raceme of T. Appollinea.

T. Apollinea, Del. ♄ *'Amyânah.* .3 to .6, appressed-canescent, branches slender, erect, flexuous. Leaflets 2-5 pairs, oblong, retuse, canescent-silky on both sides. Racemes loose, few-flowered, longer than leaves ; calyx-lobes triangular-lanceolate, somewhat longer than tube ; pods oblong, somewhat falcate, .04 long, .004 broad, appressed hairy — Spring — Sinai and westward to Egypt.

30. COLUTEA, L. Colutea. *Qasnûr.*

Calyx bell-shaped, 5-toothed, the upper teeth often longer than the others. Standard nearly round, spreading, furnished on either side above the claw with a fold or protuberance ; wings oblong, falcate; keel obtusely curved. Stamens diadelphous. Ovary 3-∞-ovuled ; style incurved, bearded lengthwise on its upper and inner aspect, hooked, its ovate stigma in the bend at its tip among the hairs. Pod stipitate, parchment-like, inflated, indehiscent or gaping at apex — Shrubs with showy yellow flowers.

1. C. arborescens, L. ♄ 1 to 3, green. Leaflets 4-5 pairs, ovate-elliptical, .02 long, .015 broad. Racemes short, 3-6-flowered, shorter than leaf ; folds of standard *short, nearly parallel;* wings *flat,* nearly as long as obtuse keel ; pods .06 long, .02 thick — Spring and early summer — Lebanon to Amanus, Kurd Dagh, and northward.

2. C. Haleppica, Lam. ♄ 1 to 3, *glaucous.* Leaflets 4-6 pairs, elliptical, .008 long, .005 broad. Folds of standard *united, horse-shoe-shaped,* wings *convolute,* longer than truncate keel ; pod .05 to .06 long, .02 to .03 thick — Spring — Sinai ; Aintâb.

31. ASTRAGALUS, L. Milk-Vetch. *Qudâd. Quteit. Asabi' el 'Arus.*

Calyx campanulate, turbinate, or tubular, in fruit unchanged or torn

or inflated, teeth 5, equal or somewhat unequal. Standard various. Keel obtuse, rarely acute, never acuminate-cuspidate ; claws of wings and keel free or nearly so, more or less adnate to the staminal tube. Style generally beardless, sometimes bearded, stigma naked, rarely bearded. Pod sessile or stipitate, varying much in form, bivalved, generally inflexed at the dorsal suture so as to be completely or incompletely 2-celled, often however quite 1-celled, the ventral suture rarely inflexed, in which case it may touch the inflexed dorsal suture — Annual or perennial herbs or shrubs, the leaves odd-pinnate, or, if abruptly pinnate, the petiole elongated, unarmed or spinescent.

SERIES A. MONOCARPICA. ANNUALS OR BIENNIALS.

** Hairs fixed by their middle or above their base.*

1 A. Arabicus, 2 epiglottis.

** * Hairs simple, fixed at base.*

† Stipules free.

‡ Flowers in heads.

§ Valves of pod keelless.

3 A. tribuloides, 4 pseudostella, 5 cruciatus, 6 radiatus, 7 triradiatus, 8 Schimperi.

§ § Valves of pod keeled.

9 A. oxyglottis.

‡ ‡ Flowers racemed, or racemed-capitate.

§ Pods linear, more or less strongly curved.

¶ Stigma bearded.

10 A. eremophilus.

¶ ¶ Stigma not bearded.

‖ Pods glabrous.

11 A. corrugatus, 12 tenuirugis.

‖ ‖ Pods pubescent.

13 A. Damascenus, 14 trimestris, 15 Gyzensis, 16 commixtus, 17 hispidulus, 18 callichrous, 19 annularis.

§ § Pods oblong, thick, slightly curved.

20 A. Bæticus, 21 aulacolobus, 22 conduplicatus.

† † Stipules, or at least the lower, connate.

‡ Pod linear-terete, falcate or hooked. Leaflets glabrous above.

23 A. hamosus, 24 brachyceras, 25 Dorcoceras, 26 canaliculatus.

‡ ‡ Pod linear-lanceolate or oblong, straight or slightly curved.

27 A. tuberculosus, 28 bombycinus, 29 Berytheus, 30 peregrinus, 31 leucophæus.

SERIES B. PERENNIALS.

SECT. I. Hairs simple, fixed at base.

** Fruiting calyx not inflated.*

† Herbs with unarmed petioles, subsessile usually capitate flowers, deciduous

petals, and several to many seeds.

‡ *Stemless or caulescent herbs with scape-like peduncles, and woolly, imbricated or crowded leaflets.*

§ *Leaflets* 6-12 *pairs.*

32 A. hirsutissimus, 33 lanatus.

§ § *Leaflets* 15-40 *pairs.*

34 A. chrysophyllus, 35 macroscepus, 36 Cedreti, 37 emarginatus, 38 cretaceus, 39 oxytropifolius.

‡ ‡ *Caulescent herbs ; leaflets not imbricated ; corolla deciduous.*

40 A. vexillaris.

‡ ‡ ‡ *Nearly stemless or caulescent ; corolla persistent.*

41 A. barbatus, 42 nanus, 43 Antilibani, 44 mollis, 45 Fresenii.

† † *Herbs or shrubs, with unarmed or thorny odd-pinnate petioles, pedicelled flowers usually racemed, deciduous petals free or nearly so, and several to many seeds.*

‡ *Stipules free from one another, and nearly or quite free from petiole.*

46 A. Lusitanicus, 47 stramineus, 48 macrocarpus, 49 Græcus, 50 Christianus, 51 Aleppicus, 52 diphtherolobus, 53 neurocarpus, 54 Shepardi.

‡ ‡ *Stipules adnate to petiole.*

§ *Pod papery or leathery.*

55 A. platyraphis, 56 Alexandrinus, 57 Amanus, 58 nummularius, 59 brachystachys, 60 pinetorum.

§ § *Pod fleshy or woody.*

61 A. sparsus, 62 acinaciferus, 63 Sieberi, 64 trigonus, 65 leucacanthus.

† † † *Erinaceous shrubs with thorny petioles, sessile flowers, a top-shaped calyx with pointed base, persistent petals, and a small, spherical, 1-seeded pod.*

‡ *Standard with a broad claw.*

66 A. gummifer.

‡ ‡ *Standard fiddle-shaped. Petals free from stamen-tube.*

67 A. Rousseanus.

‡ ‡ ‡ *Standard fiddle-shaped. Petals adherent to base of stamen-tube.*

68 A. echinus, 69 argyrothamnus.

‡ ‡ ‡ ‡ *Standard fiddle-shaped. Inner petals adherent high up stamen-tube.*

§ *Calyx not divisible to base.*

70 A. psilodontius, 71 ambiguus.

§ § *Calyx divisible to base.*

¶ *Spines* .02 *to* .08 *long ; bracts deciduous ; bractlets* 0.

‖ *Flowers in dense heads.*

72 A. Prusianus, 73 psilacmos, 74 Zachlensis, 75 cruentiflorus, 76 stromatodes.

‖ ‖ *Flowers in distinct axillary clusters, remote or crowded near tips of twigs.*

77 A. Kurdicus, 78 Bethlemiticus, 79 lepidanthus, 80 argyophyllus.

¶ ¶ *Spines* .05 *to* .25 *long ; bracts deciduous ; bractlets caducous or adherent to calyx-tube.*

81 A. andrachnefolius, 82 Andrachne, 83 Aintabicus, 84 Seytunensis, 85 Drusorum.

¶ ¶ ¶ *Spines* .15 *to* .3 *long ; bracts persistent, adherent to calyx-tube ; bractlets* 0.

86 A. Hasbeyanus, 87 deinacanthus, 88 dipodurus, 89 oxyphyllus, 90 Gaillardoti, 91 longifolius.

* * *Calyx inflated in fruit, and sometimes in flower.*

† *Leaflets abruptly pinnate. Petioles spiny. Flowers solitary or twin.*

‡ *Thorny shrubs, leaves of two forms.*

92 A. Forskahlei, 93 Russelii.

‡ ‡ *Low, almost stemless shrubs, with scape-like peduncles. Leaves all alike.*

94 A. coluteoides.

† † *Leaflets odd pinnate. Petioles unarmed. Flowers capitate or racemed.*

‡ *Pod* 1-*celled. Stipules sheathing.*

95 A. vaginans.

‡ ‡ *Pod* 2-*celled. Stipules free.*

96 A. oöcephalus, 97 pectinatus, 98 cucullaris, 99 macrocephalus, 100 Echinops, 101 Kahiricus.

SECTION II. Hairs bicuspid, fixed by their middle.

* *Herbaceous, sometimes indurated at base, unarmed.*

102 A. Kotschyanus, 103 trifoliatus, 104 schizopterus, 105 ancistrocarpus, 106 elongatus, 107 angulosus, 108 dictyocarpus.

* * *Shrubby. Petioles unarmed.*

109 A. Trachoniticus, 110 gladiatus, 111 sanctus, 112 Amalecitanus, 113 Camelorum.

* * * *Shrubby. Petioles spiny.*

114 A. angustifolius, 115 Hermoneus.

1. A. Arabicus, Ehr. ⊙ Appressed grey-woolly; stems slender, decumbent. Leaves short, leaflets 7-8 pairs, minute, obovate-oblong. Racemes axillary; peduncles somewhat shorter than leaves; flowers minute; calyx white-hairy, teeth longer than tube, as long as corolla; pods .005 long, spreading, hairy, oblong, turgid — Spring — Sinai.

2. A. epiglottis, L. ⊙ .1 to .25, appressed-canescent; stems simple, the lateral prostrate, ascending. Leaflets 4-7 pairs, linear-oblong, apiculate. Heads 6-10-flowered, axillary, ovate, short-peduncled, flowers *minute ;* calyx campanulate, teeth awl-shaped, nearly as long as tube ; pods reflexed, *triangular-heart-shaped,* .005 long, *margins folded back* — Spring ; coast ; Jordan Valley.

3. A. tribuloides, Del. ⊙ *Rukhaimî.* *Qudâd.* .03 to .1, appressed-silky, branching from neck ; branches prostrate. Leaflets 6-10 pairs, elliptical-oblong, crowded. Heads 3-6-flowered, axillary,

FIG. 131.



Leaf and pods of A. tribuloides.

sessile or nearly so ; flowers .01 long ; calyx tubular, teeth awl-shaped ; pods *appressed-hairy*, .01 long, oblong-triangular, slightly curved, acutish, base retuse, bigibbous — Spring — Sandy places ; Sinai ; Syrian desert.

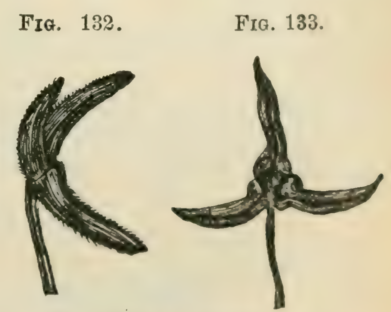
Var. **minutus,** Boiss. Flowers .005 long. Pods .005 to .006 long, somewhat longer than calyx — Nukhl to Gaza.

Var. **leiocarpus,** Boiss. Stems very short, indurated, buried in the sand. Pods, even the young ones, glabrous, transversely veined — Northern border of et-Tîh.

4. A. pseudostella, Del. .05 to .1, grey-hirsute; stems diffuse. Leaflets 8-10 pairs, oblong-elliptical. Heads axillary, *sessile*, 5-6-flowered; calyx bell-shaped-tubular, teeth as long as tube; pods .01 to .014 long, stellate, lanceolate-triangular, acute, straightish, *hirsute with spreading* hairs — Spring — Sinai ; Salihîyah (Damascus). Too near the last.

5. A. cruciatus, Link. ⊙ *Khuzâm-el-Qutt.* .1 to .3 grey-hairy; stems procumbent or ascending. Leaflets elliptical, 6-10 pairs. Heads 3-6-flowered, *peduncles longer than pods and often than leaf ;* flowers .008 to .01 long, pods stellate, .015 to .02 long, linear-lanceolate, triangular, bigibbous at base, *appressed-hairy* — Spring — Central table-lands, and eastern and southern deserts ; barren places in Palestine.

FIG. 132. FIG. 133.



Pods of A. cruciatus.

Var. **brachylobus,** Post. Flowers .01 long, pink. Pods .01 long, oblong-lanceolate, *beset with appressed hairs, and longer spreading bristles with tubercled base* — Ruins of Palmyra.

6. A. radiatus, Ehr. ⊙ .1 to .3, appressed-canescent, procumbent or ascending. Leaflets elliptical, 6-8 pairs. Heads 5-9-flowered ; *peduncles shorter than leaf;* flowers .004 to .005 long ; pods *short,* stellate, oblong from a bigibbous base, acute, straightish, *appressed-hairy* — Spring — Et-Tîh. Too near the last.

7. A. triradiatus, Bge. ⊙ .1 to .3, hirsute, prostrate or ascending. Leaflets 5-10 pairs, oblong-elliptical, obtuse or *retuse.* Heads 3-6-flowered ; *peduncles as long as pod or longer ;* pods .02 to .025 long, .004 thick, *reflexed,* lanceolate, somewhat curved, base truncate, bigibbous, *hairs of two sorts, one short appressed, the other longer, sparse, spreading, tubercled at base* — Spring — Haurân to Aleppo, and north-eastward.

8. A. Schimperi, Boiss. ⊙ *Qureidûn-aswad* .05 to .2, appressed-tomentellous, procumbent. Leaflets 4-8 pairs, oblong elliptical, obtuse. Heads 2-6-flowered ; peduncle as long as pod or leaf; pods spreading, .015 to .02 long, *linear-oblong,* nearly terete, straightish, abruptly tapering at tip, *densely hispid with spreading hairs* — Spring — Sinai.

9. A. oxyglottis, Stev. ⊙ Sparingly appressed-puberulent, diffuse. Leaflets 5-8 pairs, wedge-shaped, truncate or retuse. Heads 4-7-flowered ; peduncle shorter than leaf ; pods .01 to .013 long, stellate, glabrous or appressed-canescent, *lanceolate,* acute, transversly *tetragonal owing to the obliquely keeled valves,* the dorsal suture obsoletely grooved — Spring — Stony places ; el-Jebel-el-Abiadh (Syrian desert), and northward and eastward.

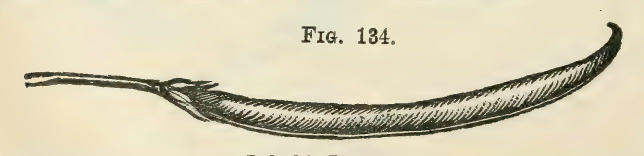
10. A. eremophilus, Boiss. ⊙ *Umm-el-Qureîn. Fajâ'a-mukd.* .3 to .4, grey-puberulent, prostrate. Leaflets 4-6 pairs, *obovate, retuse.* Racemes loosely 2-4-flowered ; peduncle shorter or longer than leaf ; standard a little longer than keel; pods .025 long, .003 thick, somewhat flattened, *semicircular,* acute, 18-20-seeded, *villous* — Spring — Sinai.

11. A. corrugatus, Bertol. ⊙ .3 to .4, sparingly appressed-hairy, procumbent. Leaflets 5-8 pairs, *linear-cuneate,* retuse. Racemes 1-4-flowered ; peduncle as long as or longer than leaf ; pods .03 to .04 long, .003 thick, semicircular, *hooked at tip, transversely wrinkled* — Spring — Sinai.

Var. **brevipes**, Post. Peduncles shorter than leaves — Wadi Feirân.

12. A. tenuirugis, Boiss. ⊙ .3 to .4, sparingly appressed-hairy, procumbent .Leaflets 6-7 pairs, *wedge-oblong,* retuse. Racemes 1-5-flowered; peduncle as long as or longer than leaf; pods curved, *ending in a short, slightly curved mucro, ventral surface slightly netted-wrinkled;* seeds 20-30 — Spring — Sinai and et-Tîh. Too near the last.

Fig. 134.



Pod of A Damascenus,

13. A. Damascenus, Boiss. et Gaill. ⊙ .2, very sparingly appressed-hairy, ascending. Leaflets 6-7 pairs, *oblong to linear,* retuse,

elongated. Racemes 3-6-flowered; peduncle shorter than leaf, at length longer; pod *erect*, .05 long, .004 thick, *straightish*, *tapering into a hook*, sparingly appressed-hairy — Spring — Haurân to Damascus and Aleppo.

14. A. trimestris, L. ⊙ Hairy, diffuse. *Stipules minute, subulate from a broader base;* leaflets crowded, 8-10 pairs, *elliptical*, retuse. Raceme 2-5-flowered ; peduncle about as long as leaf ; corolla whitish ; pods .05 long, .003 thick, *semicircular*, short-mucronate, sparingly appressed-hairy — Spring — Philistine plain and et-Tîh to Egypt.

15. A. Gyzensis, Del. ⊙ *'Adhâm-el-Fârah*. .05 to .1, appressed-grey-puberulent, spreading. Leaflets 1-3 pairs remote, *broad-elliptical to elliptical-oblong*, retuse, the terminal larger, often .008 long, .006 broad. Racemes loosely 3-5-flowered ; peduncles shorter than the long-petioled leaf; corolla whitish ; pods .025 to .03 long, .003 thick, semicircular, *beset with two kinds of hairs*, *one short*, *appressed*, *the other longer*, *spreading*, *tubercled at base*, *short-mucronate* — Spring — South of Dead Sea, and southward to Sinai and Egypt.

Fig. 135.



Pods of A. Gyzensis.

16. A. commixtus, Bge. ⊙ .1, canescent, nearly stemless. Leaflets oblong-elliptical, obtuse. Racemes 2-5-flowered, *much longer than leaves;* calyx-tube cylindrical; standard nearly round, ending abruptly in a linear, obtuse appendage ; pods erect, .03 long, .002 thick, semicircular, *hooked at tip*, hispid with appressed and spreading hairs — May — Qaldûn (Antilebanon).

17. A. hispidulus, Astr. ⊙ .3, sparingly pubescent, somewhat diffuse. Leaflets 6-7 pairs, elliptical-oblong, obtuse. Racemes 3-4-flowered ; peduncle about as long as leaf ; calyx cylindrical ; standard ovate-oblong, gradually tapering; pod flattened-cylindrical, slender, .04 long, .0015 broad ; semicircular, acute, appressed-bristly — Spring — Et-Tîh to Sinai and Egypt.

18. A. callichrous, Boiss. ⊙ .1 to .3, villous, diffuse. Leaflets 5-8 pairs, oblong-elliptical to linear, obtuse. Racemes capitate, 5-8-flowered ; peduncles as long as leaf or longer; flowers violet, *showy*, .02 long; standard gradually tapering ; pods .04 to .05 long, .002 thick, flattened, cylindrical, semicircular, acute, appressed-bristly — Spring — Southern Palestine near desert ; Wilderness fo Judea ; Jordan Valley; Moab; Palmyra.

19. A. annularis, Forsk. ⊙ .1 to .3, pubescent, diffuse. Leaflets 1-3 pairs, obovate to obovate-oblong, obtuse. Racemes 2-4-flowered ; peduncle

Fig. 136.



Pod of A. annularis.

about as long as leaf ; pods .04 to .05 long, .002 thick, semicircula to circular, *ending in a short, incurved point*, appressed-bristly, at length glabrescent, *mottled with red* — Spring — Sandy places ; southern Palestine to et-Tîh and Egypt.

20. A. Bæticus, L. ⊙ .3 to .4, sparingly hairy, green, erect. Leaves .1 or more long ; leaflets 9-10, oblong to linear, retuse. Lower flowers solitary, *subsessile*, upper racemes densely 2-15-flowered ; peduncle shorter than leaf ; pods *erect*, *prismatic-oblong*, .03 long, .007 thick, obtuse, *straight*, hooked at tip, appressed-bristly — Spring — Coast ; Tripoli and southward ; Jordan Valley.

21. A. aulacolobus, Boiss. ⊙ .3, glabrous, ascending. Leaflets 6-7 pairs, wedge-oblong, retuse. Racemes 1-4-flowered, rather loose; peduncles as long as leaf; pods .025 long, .005 broad, deflexed, *semicircular* scarcely flattened, tapering, often rusty-spotted — Spring — Aintâb, and eastward.

22. A. conduplicatus, Bertol. ⊙ .1 to .4, glabrescent, erect or decumbent. Leaflets 5-7 pairs, wedge-oblong to linear, retuse or obcordate. Peduncles shorter than leaves or longer, loosely 1-4-flowered, *awned at tip ;* pods oblong, slightly curved, acute, .025 long, .005 thick, spreading or deflexed, *mottled with brown, dorsal surface, obtusely 2-keeled* — Spring — Haurân to Palmyra, Syrian desert, and Aleppo.

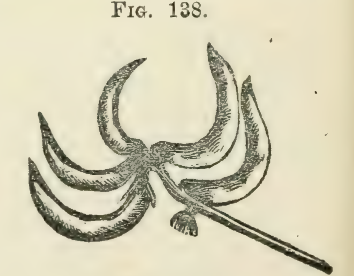
FIG. 137.

Pods of A. conduplicatus.

23. A. hamosus, L. ⊙ .3 to .5, appressed-pubescent, erect or diffuse. Leaflets 8-10 pairs, obovate to oblong, retuse or obcordate, glabrous above. Racemes capitate, *many-flowered ;* peduncle shorter than leaf ; pods deflexed, *cylindrical-terete*, *fishhook-shaped*, .06 long, .002 thick, sparingly appressed-hairy — Spring — Weedy places ; common throughout.

24. A. brachyceras, ⊙ *Deqîs.* .3 to .4, appressed-pubescent, diffuse or erect. Leaflets 8-12 pairs, oblong to cuneate-oblong and linear, retuse. Racemes very short, axillary, 4-8-flowered ; peduncles longer or shorter than leaves ; pods spreading, *oblong-linear*, *terete*, .02 long, .003 thick, *semilunar* — Spring — Grassy places ; Moab to Haurân, Aleppo and eastward.

FIG. 138.



Pods of A. brachyceras.

25. A Dorcoceras, Bge. ⊙ .3 to .4, appressed-hairy, ascending or diffuse. Leaflets 9-10 pairs, wedge-oblong, retuse. Racemes 3-7-flowered ; peduncle *half as long as leaf;* pods .05 to .06 long, *cylindrical-terete*, *fishhook-shaped*, *nearly circular* — Spring — Grassy places ; Aleppo.

26. A. canaliculatus, Willd. ⊙ .1 to .3, sparingly appressed-bristly; stems simple or branching from base. Leaflets 6-8 pairs, obovate to oblong, retuse. Flowers *solitary or twin*, axillary, *sessile;* pods .04 to .05 long, .002 thick, cylindrical-terete, *falciform with a short, hooked tip* — Spring — Fields between Bosrah and Qurêyah (Haurân). An Algerian plant, not before found in Syria.

FIG. 139.



Leaf and Pod of A. canaliculatus.

27. A. tuberculosus, D.C. ⊙ ♃ .3 to .5, white-hirsute; stems numerous, prostrate. Leaflets 8-12 pairs, obcordate to oblong, notched. Racemes many-flowered, *at first ovate, dense*, at length .05 to .1 long, peduncle longer than leaf; flowers yellowish, .02 long; calyx *white- and black-hirsute;* pods *ovate-oblong*, .02 to .03 long, .008 to .01 thick, ending in a *short hook;* back flattish, with a broad, shallow groove, face scarcely keeled, *tubercled-wrinkled* — Spring — Neglected fields and roadsides; common.

FIG. 140.



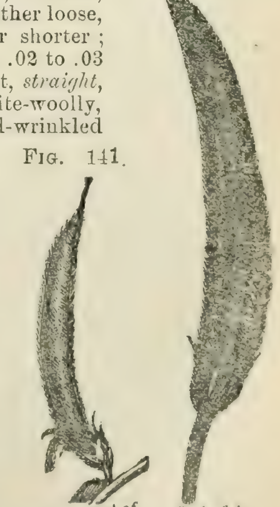
Pods of A. tuberculosus.

28. A. bombycinus, Boiss. ⊙ ② *Durreis. Khansarat-el-'Arûs.* .1 to .4, *loosely clothed with wavy-white wool*, prostrate. Leaflets 6-12 pairs, minute, obovate, retuse, *often crowded.* Racemes rather loose, 2-4-flowered; peduncle as long as leaf, or shorter; calyx *white-woolly;* pods oblong-lanceolate, .02 to .03 long, .006 broad, incurved, ending in a short, *straight, or somewhat incurved point*, densely white-woolly, back broad-grooved, face keeled, netted-wrinkled toward margin—Spring — Et-Tîh to Sinai, Egypt, and southward.

29. A. Berytheus, Boiss. et Bl. ⊙ ② .4, white-villous, prostrate. Leaflets 7-8 pairs, small, cuneate-oblong. Racemes 7-8-flowered, somewhat capitate, peduncle nearly equalling leaf; calyx black-hairy, teeth half as long as tube; standard tapering, retuse; pods white-hairy, lanceolate-linear, 3-angled, .025 long, .005 broad, somewhat curved, acute, back narrow-grooved, face keeled, minutely rough-tubercled — Spring — Sandy fields; Beirût.

30. A. peregrinus, Vahl. ⊙ .2 to .4, loosely white-villous, prostrate. Leaflets oblong-cuneate, retuse. Racemes rather loose, 3-5-flowered, peduncle shorter than

FIG. 142. FIG. 141.



Immature pod of A. Berytheus

Pod of A. peregrinus.

leaf ; calyx white- and black-hairy, teeth somewhat shorter than tube ; standard *short, acute;* pods lanceolate, .04 long, .006 thick, somewhat curved, acute, grooved at back, keeled at face, minutely rough-tubercled — Spring — Sandy fields ; southern Palestine.

31. A. leucophæus, Smith. ⊙ Procumbent, canescent. Leaflets 12-14 pairs, obcordate. Peduncles shorter than leaves ; pods terete, acute, glabrous — Spring — Said by Paine to be found in Moab. The above description too meagre for diagnosis, is taken from De Candolle's Prodromus, II., 293. I have not seen the plant.

32. A. hirsutissimus, DC. ♃ .05 to .15, tomentose. Stipules lanceolate, short-connate ; leaves .03 to .08 long, oblong, leaflets 8-12 pairs, crowded, oblong, .006 to .01 long, obtuse, conduplicate. Scapes *about as long as leaves;* heads dense, ovate, .03 to .04 long ; bracts lanceolate, nearly as long as calyx-tube ; calyx villous, teeth half as long as tube ; pod densely *long-hispid, ovate-oblong,* .008 long, flattened, *twice as long as straight beak* — Summer — Highest summits of Lebanon.

33. A. lanatus, Labill. ♃ .05 to .15 caulescent, appressed-grey-pubescent. Stipules lanceolate, short-connate ; leaves linear-oblong, .03 to .05 long ; leaflets 6-9 pairs, sometimes rather remote, *ovate to elliptical,* .006 long. Scape *somewhat longer than leaf;* heads ovate, .015 long; bracts *oblong,* one-third as long as calyx-tube ; calyx black- and white-pubescent, teeth *one-third* as long as tube; pod *oblong-triangular,* flattened, .006 long, nearly twice as long as straight beak — Summer — Alpine Lebanon and Antilebanon.

34. A. chrysophyllus, Boiss. ♃ .1, nearly stemless, tufted, appressed-silky, *yellowish.* Stipules united into one, *bifid into two tapering lobes;* leaves linear, .1 long; leaflets 28-35 pairs, ovate to oblong, .006 long, retuse, densely imbricated. Scapes somewhat longer than leaf ; heads globular ; bracts linear, longer than calyx-tube ; calyx reddish-hirsute, teeth half as long as tube ; pod .01 long, hispid, ovate-triangular, flattened, *as long as straight beak* — June — Amanus to mountains of Aintâb, and northward.

35. A. macroscepus, Boiss. ♃ .15 to .25, short-stemmed, rusty-woolly. Stipules united into one, oblong-lanceolate, 2-toothed ; leaves .15 to .2 long, .012 broad ; leaflets 30-40 pairs, *round-ovate,* .006 long, retuse. Scapes longer than leaves ; heads dense, ovate, *larger than a walnut ;* bracts linear-awl-shaped, as long as calyx ; calyx-teeth as long as tube ; corolla slightly longer than calyx ; pod triangular-ovate, flattened, .006 to .007 long, as long as beak — Summer — Amanus ; Akherdagh.

36. A. Cedreti, Boiss. ♃ .1 to .25, tomentellous, yellowish-grey ; stems slender, naked. Stipules lanceolate, connate below ; leaves .06 to .1 long ; leaflets 20-25 pairs, ovate to oblong, retuse. Scapes longer than leaves ; heads ovate, dense, smaller than a walnut; bracts linear-subulate, as long as slender calyx-tube ; calyx rusty-hispid, teeth awl-shaped, one-third as long as tube ; standard oblong, *truncate;* pod * * — May to July — Subalpine Lebanon and Antilebanon.

37. A. emarginatus, Labill. ♃ .1 to .25, appressed-yellow-woolly ; stems short. Stipules united, oblong-lanceolate, biacuminate;

leaves .1 to .2 long ; leaflets oblong, retuse, 18-25 pairs. Scapes thick, longer than leaves ; heads dense, ovate-oblong ; bracts linear-lanceolate ; calyx hispid, teeth scarcely shorter than tube ; standard oblong-linear, retuse, much longer than wings ; pod densely rusty-hispid, ovate, flattened, *short-mucronate* — April to June — Subalpine Lebanon and Antilebanon ; Akherdagh.

38. A. cretaceus, Boiss. et Ky. ♃ .15 to .25, nearly stemless, *pannous*, canescent or yellowish-grey. Stipules connate, triangular, bifid ; leaflets 18-25 pairs, oblong to linear-oblong, retuse, crowded. Scapes thick, as long as leaves or longer ; heads ovate-oblong, *smaller than a walnut*, dense ; bracts linear ; calyx woolly-hispid, teeth one-third as long as tube ; *corolla brick-red ;* standard ovate, nearly entire ; pod densely long-hispid, oblong, .015 long, flattened, tapering into a *short*, straightish beak — April and May — Chalky soil ; Antilebanon ; Syrian desert to et-Tîh, and eastward to Euphrates.

39. A. oxytropifolius, Boiss. ♃ .2 to .3, stemless, greyish or yellowish woolly. Stipules lanceolate, acuminate, connate at base ; leaves .1 to .2 long, leaflets 20-25 pairs, at first crowded, *then more or less distant*, oblong to linear-oblong, retuse. Scapes thick, longer than leaf, *black- and white-hispid ;* heads *as large as a walnut*, in fruit .06 to .08 long ; calyx rusty-hirsute, teeth somewhat more than half as long as tube ; standard rhomboid, retuse ; pod rusty-hirsute, oblong, flattened-triquetrous, .006 long, tapering into a somewhat incurved *beak as long as cell* — April and May — Stony places ; Gilead and Moab.

40. A. vexillaris, Boiss. ♃ .15 to .35, sparingly appressed-hairy, green, ascending or diffuse. Stipules triangular, lanceolate, scarcely connate ; leaflets 15-30 pairs, .005 to .01 long, elliptical to oblong, obtuse or retuse. Peduncles about as long as leaf ; heads ovate, as large as a walnut or larger ; bracts lanceolate, as long as calyx-tube, calyx white- and black-hispid, teeth awl-shaped, half as long as tube ; corolla yellow, standard linear, .02 to .03 long, *nearly twice as long as keel ;* pod nearly sessile, white-villous, *half-ovate*, somewhat flattened, .01 long, ending in a slender, incurved beak about as long as cell —May — Calcareous soil ; Haurân to Aintâb, and northward and eastward.

41. A. barbatus, Lam. ♃ .15 to .2, *strigose-hispid*, canescent. Stipules lanceolate, *pectinate-ciliate*, short-connate or free ; leaflets 6-8 pairs, elliptico-linear, rather acute. Head ovate, short-peduncled, *in the uppermost axil ;* calyx-teeth *twice as long as tube ;* bracts longer than calyx-tube ; standard oblong, tapering, obtuse ; pods oblong, somewhat flattened, shorter than calyx — Spring —

Var. **Billardieri,** Boiss. Calyx-teeth shorter ; standard shorter, less tapering — Lebanon.

42. A. nanus, DC. ♃ .05 to .1, *bristly-hirsute, shining, densely leafy*. Stipules oblong-lanceolate, connate at base, bristly ; leaves .025 long ; leaflets 6-9 pairs, elliptical-linear, obtuse. Peduncles 1-2, shorter than leaf and globular head ; bracts lanceolate, pectinate-ciliate, longer than calyx-tube ; calyx-teeth longer than tube and standard ; pod shorter than calyx, oblong, *3-angled-prismatic*, somewhat flattened, .01 long, appressed-hairy, short-mucronate — Summer — Lebanon.

43. A. Antilibani, Bge. ♃ .05 to .1, nearly stemless, green. Stipules connate-sheathing at base, somewhat adnate to petiole, broad-triangular, ciliate; leaflets 12-14 pairs, oblong, obtuse, *sparingly appressed-hirsute at margins and lower surface, upper surface glabrous. Scapes* shorter than leaves; *raceme oblong;* bracts linear, tapering, as long as calyx-tube; calyx white- and black-appressed-pubescent, teeth half as long as tube; standard rhombic at base, bilobed, slightly longer than wings; pod white-villous, scarcely longer than calyx, .01 long, semi-ovate, recurved, *hooked at tip* — Summer — Alpine region of Anti-lebanon.

44. A. mollis, M.B. ♃ .1 to .25, hirsute; stems several, very short. Stipules oblong-lanceolate, free; leaflets 12-15 pairs, *elliptical, villous on both sides,* Scapes shorter than leaves; *racemes ovate* .02 *long, in fruit oblong* .05 to .06 *long;* bracts black, half as long as calyx-tube; calyx villous, teeth blackish, one-third as long as tube; standard ovate or oblong, somewhat retuse, a little longer than wings; pod about as long as calyx, densely white-hairy, half-ovate, 3-angled, .01 to .013 long, with a slender, incurved beak — May — Eastern plateau of Antilebanon to Qaryetein.

45. A. Fresenii, ♃ .05 to .1, dividing from ground into several trunklets and branches, loosely woolly-canescent. Stipules black-hispid, triangular-lanceolate, nearly free; leaflets 12-15 pairs, elliptical to oblong, obtuse. Peduncles longer than leaves, black-hairy at tip; head ovate, *in fruit* oblong-cylindrical; bracts much shorter than calyx; calyx black- and white-villous, teeth black, one-fourth as long as tube; standard ovate, somewhat retuse, slightly longer than wings; pods sessile, white-villous, half-oblong, 3-angled, ending in an incurved point — April — Convent of St. Catherine, (Sinai.)

46. A. Lusitanicus, Lam. ♃ .6 to 1, *velvety-canescent;* stem erect, angular-striate, scaly below, leafy above. Leaflets 7-10 pairs, oblong-elliptical, .02 to .03 long, mucronate; lower stipules triangular-lanceolate, upper subulate. Racemes axillary, short-peduncled, flowers white, *nodding,* .025 to .03 long; calyx campanulate, rusty-hirsute, obliquely truncate, teeth half as long as tube; petals more than twice as long as calyx; pods *oblong,* .08 long, .02 broad, tomentellous, stipitate, obliquely mucronate — March and April — Khan Kehhâli (Lebanon). Adventive.

47. A. stramineus, Boiss. et Ky. ♃ .6, glabrescent; stems erect, rather thick. Stipules *straw-colored,* triangular-lanceolate, tapering; leaflets 7-8 pairs, linear-elliptical, .02 long, obtuse or retuse. *Racemes* .25 *or more long,* on a short, stiff peduncle; calyx *appressed-white-hairy,* teeth lanceolate, one-fourth as long as tube; petals .018 long; pods pendulous, glabrous, short-stipitate, *linear,* .04 long, .005 broad, somewhat three-angled — Spring — Antilebanon.

48. A. macrocarpus, DC. ♃ .6, appressed-hirsute. Stipules lanceolate-subulate; leaflets 12-15 pairs, oblong-elliptical, .01 to .02 long, retuse. Racemes few-flowered; calyx sparingly white-villous, lobes lanceolate, half as long as tube; standard oblong-spathulate, retuse, longer than straight wings; keel shorter than wings; pods *obovate* .05 long, .03 broad, inflated, very obtuse, woody, ending in a .01 long beak — Spring — Coast and lower mountains.

49. A. Græcus, Boiss. ♃ .6, villous. Stipules lanceolate-linear. Leaflets 30-40 pairs, elliptical-ovate to obcordate-orbicular, the lower .01, the upper .002 long. Racemes 5-10-flowered ; calyx white-fleecy, teeth subulate, a *little shorter than tube; keel shorter than wings;* pod short-hirsute, ovate, .03 long, .015 broad, abruptly tapering into a straight, .01 long beak — May — Jebel Husha' ; Gilead ; Haurân.

50. A. Christianus, L. ♃ .6, hirsute. Stipules subulate, broader at base ; leaflets 15-20 pairs, elliptical, .015 to .02 long, obtuse or retuse. Racemes sessile, 3-4-flowered ; calyx white-hispid, teeth subulate, two-thirds as long as tube ; standard ovate or orbicular ; *keel much shorter than wings;* pods *hispid*, obliquely ovate, .015 to .02 long, .015 broad, wrinkled, ending in a straight beak — Spring — Plain of Gennesaret (Tristram).

51. A. Aleppicus, Boiss. ♃ Appressed-canescent to hirsute. Stipules lanceolate to linear-subulate ; leaflets 15-30 pairs, *elliptical to orbicular*, .005 to .01 long, sometimes retuse. Racemes sessile, 1-4-flowered ; calyx white-hirsute, teeth lanceolate-subulate, *one-third as long as tube; keel somewhat longer than wings;* pods *pubescent*, deflexed, oblong, flattened, .02 long, .01 broad, netted-wrinkled, ending in a .01 long, straight beak — April and May — Fields ; east of Jordan to Cœlesyria, Damascus plain, Aleppo, Aintab and northward and eastward.

52. A. diphtherolobus, Bge. ♃ .6 to 1, *puberulent*. Stipules subulate, elongated ; leaflets 15-20 pairs, elliptical, obtuse or retuse, .01 long. Flowers .035 long; calyx .02 long, white-hairy, teeth subulate, *longer than tube; keel much shorter than wings;* pods densely *pannous*, oblong, .025 long, .013 broad, slightly compressed, ending in a .01 long beak — May — Woods ; higher regions of Amanus.

53. A. neurocarpus, Boiss. ♃ .6, *glabrescent*. Stipules setaceous from a dilated base; leaflets less than 16 pairs, *ovate oblong*, .015 to .02 long, retuse, the lower surface sparingly hirsute. Racemes 2-3-flowered, crowded ; calyx white-villous, teeth triangular, *one-fourth* as long as tube ; standard obovate-oblong, longer than wings; wings longer than keel; pods *semi-ovate*, .013 long, .007 broad, somewhat incurved, *prominently netted-wrinkled;* mucro .004 long — Spring — Haurân to Aintâb, and northward.

54. A. Shepardi, Post. ♃ .6 to 1, *stem and petioles glabrous*. Stipules lanceolate-subulate; lower leaves .3 to .4 long, leaflets 15-20 pairs, lower surface sparingly hirsute, upper *glabrous, orbicular, to ovate-orbicular*, .01,long, *distant*. Racemes 2-3-flowered, calyx sparingly villous, teeth triangular one-third as long as tube; pods *glabrous, semi-ovate*, .02 long, .01 broad, *obsoletely wrinkled*, ventral suture thick, excurrent in a stout, .01 long beak — May — Aintâb.

55. A. platyrhaphis, Fisch. ♃ .1 to .25, green, hirsute, stemless. Leaflets 12-16 pairs, ovate to elliptical, glabrous above. Racemes 5-7-flowered ; scape shorter than petiole ; calyx-teeth one-fourth to one-fifth as long as tube ; pod stipitate, *oblong, acutely triquetrous*, mucronate — Spring — Aleppo to Aintâb, and eastward and northward.

56. A. Alexandrinus, Boiss. ♃ .1 to .25, hirsute, stemless. Leaflets 13-15 pairs, ovate to elliptical and oblong, upper surface glabrous. Racemes 5-7-flowered, short-peduncled ; calyx-teeth one-third to

one-fifth as long as tube; pods *almost sessile, ovate,* somewhat 3-angled, mucronate — Spring—Sandy fields; Syrian desert and Damascus plateau to Cœlesyria, Jordan Valley, Haurân, Moab, Gilead, and southward to Egypt. Probably a variety of the last.

57. A. Amanus, Boiss. ♃ .3, nearly stemless, *glabrescent.* Stipules lanceolate, ciliolate at tip; leaflets 6-10 pairs, remote, ovate, .02 to .025 long, .015 to .018 broad, *sparingly hairy on the lower surface at mid-rib, otherwise glabrous.* Racemes 3-4-flowered, short-peduncled; calyx-teeth plumose, subulate from a broader base, half as long as glabrous tube; pods loosely hispid, ovate, .025 long, obtusely triquetrous, obtuse, mucronate, dorsal surface very broad, flat — Spring — Dry schist above Beilân (Amanus).

58. A. nummularius, DC. ♃ .05 to .15, villous, tufted, stemless from under-ground trunks. Stipules lanceolate, villous. Leaflets 8-12 pairs, round to elliptical or ovate, .006 long, sometimes retuse. Flowers nearly sessile; calyx-teeth more than half as long as tube; standard oblong-spathulate, retuse, generally pubescent, wings glabrous; pods hirsute, ovate, .01 long, .007 broad, cuspidate, flattened — Summer —

Var. **macrophyllus,** Post. Leaflets .006 to .01 long. Calyx-lobes less than half as long as tube; corolla .03 long — Djurd Hasrûn.

Var. **trichopterus,** Post. Leaves minute. Flowers .02 long; standard linear, wings ciliate — Alpine Lebanon and Antilebanon (*A. trichopterus, Boiss*).

59. A. brachystachys, DC. ♃ .15 to .3, short-stemmed, *crisp-velvety-pubescent.* Stipules lanceolate, hirsute; leaflets 8-12 pairs, *ovate,* .01 to .013 long, obtuse. Raceme ovate, 5-7-flowered; peduncle shorter than leaf; flowers .025 to .03 long; calyx-lobes lanceolate, one-fourth as long as tube; standard oblong, retuse, longer than linear wings; pod pubescent, ovate, *inflated,* .025 long, acute, *cuspidate,* stipitate — Spring — Aleppo to Aintâb, and eastward.

Var. **hirsutus,** Post. Indument *sparingly hirsute,* not velvety-pubescent — Marash. [Jebel Husha' (Gilead) ?]

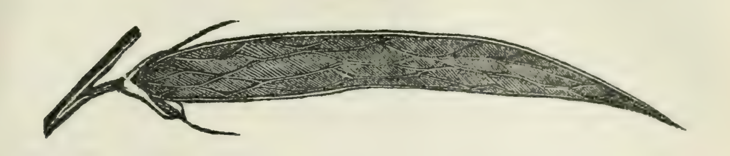
60. A. pinetorum, Boiss. ♃ .3, pubescent or hirsute, stemless; trunks subterranean. Stipules oblong; leaflets 15-20 pairs, *elliptical,* obtuse or acutish. Racemes 3-5-flowered, *nearly radical,* numerous, subsessile; calyx-teeth lanceolate, more than half as long as tube; standard oblong, obtuse, longer than wings; pod hirsute, *semi-oblong, triquetrous,* flattened, tapering into an incurved point — Alpine and subalpine Lebanon and Antilebanon.

61. A. sparsus, Dec. ♃ .3 to .6, white-woolly; stems white, prostrate. Stipules herbaceous, elongated, tapering, leaflets 10-15 pairs, crowded, ovate-oblong, .015 to .02 long, obtuse, conduplicate. Racemes nearly sessile, 4-5-flowered; calyx-teeth lanceolate, somewhat shorter than tube; standard oblong, .03 long; pods stellate, crustaceous, hirsute, lanceolate, .05 long, .007 broad, somewhat flattened and incurved, tapering into a long, oblique beak — Spring — Sinai.

62. A. acinaciferus, Boiss. ♄ .2 to .4, stemmed or nearly stemless, *appressed-strigulose,* canescent. Stipules crowded, triangular; leaflets about 20 pairs, ovate, obtuse or retuse, .004 to .005 long,

crowded, conduplicate. Flowers 1-2, axillary, short peduncled; calyx-teeth one-fifth as long as tube ; pod at length glabrescent, linear, .07

FIG. 143.



Pod of A. acinaciferus.

long, .008 broad, compressed, falcate, marked with longitudinal, wavy nerves, acutely beaked — Spring — Dead Sea to Sinai and Egypt.

FIG. 144.



Pod of A. Sieberi.

63. A. Sieberi, DC. ♃ *Qudâd. Asabi'-el-'Arûs. Khansar-el-'Arûs.* .2 to .5, stems short, leafy, appressed-*canescent.* Stipules triangular-tapering, hispid; leaflets 20-25 pairs, ovate, obtuse, .003 to .005 long, conduplicate, glabrous above, appressed-hirsute below. Flowers axillary, nearly sessile ; calyx-teeth one-quarter as long as glabrescent tube ; pod sparingly appressed-strigulose, *oblong-triquetrous*, slightly curved, .05 long, .008 broad, longitudinally wrinkled, tapering into a stout beak — April — North end of Dead Sea to Sinai and Egypt.

64. A. trigonus, DC. ♄ .25, much branched ; branches thorny, short intricate ; thorns strong, .02 long, close-set. Stipules triangular, acute, short ; leaflets 6-7 pairs, minute, ovate-orbicular, retuse, glabrous above. Flowers 1-2, sessile, axillary, .01 long ; calyx-teeth one-third as long as tube ; pod appressed-canescent, *semi-oblong-triquetrous*, .015 long, .005 broad, somewhat incurved, tapering to a beak — Spring — South end of Dead Sea to Sinai and Egypt.

65. A. leucacanthus, Boiss. ♄ .5, branches appressed-canescent. Spines .05 long ; stipules triangular-acuminate ; leaflets 5-6 pairs, ovate, obtuse, sparingly appressed-hisrute below. Racemes 2-4-flowered, axillary, nearly sessile ; flowers .01 to .013 long ; calyx-teeth one-fourth as long as tube ; pod appressed-canescent, .015 long, semi-oblong-triquetrous, acuminate—Spring — Between Suez and A'yun Musa, and northward.

66. A. gummifer, Labill. ♄ .3 to.6, branches intricate, naked; twigs woolly, armed with stiff, yellow, .02 to .05 long spines, between the glabrous, yellow, ovate-lanceolate, chartaceous stipules. Leaflets conduplicate, glabrous, 4-6 pairs, elliptical-oblong, acute, muticous or mucronulate, shorter than terminal spine. Axils 2-3-flowered, forming ovate or oblong, sometimes loosely spiked heads at base of twigs ; bracts round-ovate, boat-shaped, obliquely truncate, longer than calyx-tube ; calyx very villous, limb of standard retuse, somewhat shorter than claw — Summer — Subalpine and alpine Lebanon and Antilebanon ; Akherdagh.

67. A. Rousseanus, Boiss. ♄ .05 to .15, branches slender, partly under ground, simple, woolly between ovate-lanceolate, hirsute, ciliate stipules. Leaflets 5-7 pairs, conduplicate, linear, muticous, *appressed-hirsute.* Axils 2-flowered, *forming a cylindrical-club-shaped spike,* .03 to .06 long, .01 to .015 broad, leafy, extending nearly to end of twigs; bracts subulate, hirsute, nearly as long as calyx-tube; calyx-tube villous at base, teeth somewhat shorter than tube, standard somewhat longer than calyx, fiddle-shaped — May and June — Cœlesyria to Aleppo, Aintâb, and north-eastward.

68. A. echinus, DC. ♄ .3 to .5, densely branched, echinate with .02 to .03 long spines, old ones persistent, black. Stipules triangular-acuminate, glabrous, ciliate; leaflets 5-7 pairs, *oblanceolate, appressed-canescent,* spiny-mucronate, shorter than terminal spine. Flowers crowded in a globular, .02 broad head; calyx-teeth concealed by their villi, as long as tube — Summer — Alpine regions of Sinai, Lebanon, and Antilebanon.

Var. **virens,** Boiss. Petioles stiff, .05 long; leaflets *green* — Near Cedars.

69. A. argyrothamnus, Boiss. ♄ 1, much branched; spines thick-set, slender, .03 long, ascending. Stipules ovate, short-acuminate, ciliate; leaflets 4-5 pairs, *minute,* flattish, ovate, obtuse, mucronulate, silvery-canescent, shorter than terminal spine. Flowers three or less in a globular head, crowded at base of leaves; bracts *broad-ovate, boat-shaped,* very obtuse; calyx-teeth concealed by villi, nearly as long as tube — Summer — Middle region of Antilebanon.

70 A. psilodontius, Boiss. ♄ .2 to .3, appressed-canescent; branches slender; twigs crowded, short. Leaves scattered; petioles thick, .03 to .05 long, ending in a spine much longer than the leaflets; leaflets 6-7 pairs, crowded, small, conduplicate, *ovate,* acutish, muticous; stipules *ovate-lanceolate, with a broad, translucent margin,* bearded at back. Axils 3-5-flowered, forming somewhat distant bunches; bracts oblong, broad, acute, concave, as long as calyx tube, margin translucent; calyx hirsute, teeth once and a half as long as tube, somewhat longer than rusty corolla — Summer — Antilebanon; Wadi-el-Jaur (south of Damascus).

71. A. ambiguus, Bge. ♄ .2 to .3, branches short, glabrous, slender; spines crowded, slender, spreading, .03 to .05 long; stipules *lanceolate-acuminate,* ciliate; leaflets 7-9 pairs, *obovate, conduplicate, obtuse,* .005 long, mucronate, *hispid,* a little shorter than terminal spine. Axils 2-flowered, crowded in small, globular heads as large as a hazel nut, at base of branches; bracts oblong-lanceolate, boat-shaped, tapering, villous except at base, somewhat shorter than calyx; calyx very villous, teeth subulate, once and a half as long as tube; corolla purple or violet — June — Alpine regions of Amanus.

72. A. Prusianus, Boiss. ♄ .2 to .3, much branched; branches long, *loosely spiny, woolly-canescent.* Spines .04 to .08 long; stipules *triangular,* tomentellous; leaflets 6-8 pairs, obovate-oblong to ovate-oblong and oblong, .005 to .01 long, *prickly,* appressed-woolly-canescent. Axils less than 5-flowered, forming globular or ovate-oblong terminal heads; bracts *ovate,* woolly on outer face except at base, boat-

shaped, often 2-lobed, calyx .007 long, woolly-canescent — Summer — Bashlamîsh (Amanus), Antioch and northward.

Var. **brevifolius,** Post. Leaflets .003 to .006 long, elliptical-ovate to obovate — Bashlamîsh.

Var. **alpinus,** Post. Compact. Spines .02 to .03 long. Leaflets 3-4 pairs, .004 long, .002 broad — Akherdagh.

73. A. psilacmos, Bge. ♄ .2 to .4, branches short, thickish, *nearly glabrous.* Spines .05 to .08 long, spreading ; stipules broad-ovate, *tapering*, villous at base ; leaflets remote, 5-6 pairs, *oblong-lanceolate*, .013 to .015 long, prickly, appressed-canescent, upper face prominently nerved. Axils 10-13-*flowered*, densely crowded into a head *larger than a walnut*, often lobed ; bracts broad-obovate-cuneate, concave, glabrous at base, densely woolly toward tip, obtuse, mucronate, longer than calyx-tube ; calyx .01 long, white-villous — Summer — Marash.

74. A. Zachlensis, Bge. ♄ .2 to .3, branches short, thick, silky between the crowded, .03 to .05 long spines. Stipules ovate, acute, woolly or ciliate, at length glabrescent; leaflets 4 pairs, oblong-lanceolate, .01 long, prickly, keeled, appressed-silky-canescent, shorter than terminal spine. Axils 5-7-flowered, densely crowded into ovate or oblong, leafy heads, .025 to .05 long ; bracts ovate-oblong, acute, boat-shaped, incurved, densely woolly, longer than calyx-tube — Spring and summer — Subalpine Lebanon and Antilebanon.

75. A. cruentiflorus, Boiss. ♄ .5 to .7 ; stems beset below with dense, black, .02 to .04 long spines; younger spines stout, spreading ; branches woolly between stipules. Stipules thin, translucent, triangular, acute, ciliate ; leaflets 6-7 pairs, crowded, ovate, .003 long, conduplicate, prickly-mucronate, silvery-silky. Axils 4-5-flowered, forming dense, globular heads, *enclosed by the terminal leaves ;* bracts ovate, concave, acute, membranous, woolly along middle of back, longer than calyx-tube — Summer — Alpine Lebanon and Antilebanon.

76. A. stromatodes, Bge. ♄ .3 to .5, *gum-bearing*, very thorny, with blackish branches. Spines .02 to .04 long, slender, crowded, the young ones *yellow*, ascending; stipules ovate, acuminate, ciliate, the younger appressed-pubescent ; leaflets 5-pairs, *oblong-lanceolate to linear-lanceolate*, .004 to .01 long, mucronate, conduplicate, appressed-silky-canescent. Axils 4-5-flowered, crowded at base of branches in dense, globular heads larger than a walnut ; bracts ovate, boat-shaped, acute, tomentellous along middle of back, longer than calyx-tube ; calyx .012 long — Snmmer — Alpine regions of Akherdagh. Too near the next.

Var. **microphyllus,** Boiss. More compact, low. Spines .02 to .03 long. Leaflets .005 to .008 long.

77. A. Kurdicus, Boiss. ♄ .3 to .5 ; branches naked, twigs thick-set with blackened, appressed spines. Stipules *lanceolate*, prominently nerved, tender at tip, ciliate ; leaflets flat or somewhat conduplicate, elliptico-lanceolate, .006 to .008 long, tapering into a long prickle, silvery. Axils 2-6-flowered, somewhat distant, arranged in a *short, rather loose spike at the base of the wings;* bracts ovate, boat-shaped,

acute or acuminate, longer than calyx-tube, tomentellous at back; calyx .013 to .015 long — Summer — Akherdagh.

78. A. Bethlemiticus, Boiss. ʒ .2 to .4, densely beset with stout, *tomentellous-canescent* spines, .04 to .05 long. Stipules ovate, tomentellous, the free portion triangular, ciliate; leaflets 4-5 pairs, *oblong*, mucronate, keeled, silky-canescent. Axils 3-5-flowered, collected near tips of twigs ; bracts broad-ovate, concave, mucronate, longer than calyx-tube, woolly at back ; *calyx-teeth thrice as long as tube* — June — Southern Judea and Moab to Lebanon, Cœlesyria, Antilebanon and Damascus.

79. A. lepidanthus, Boiss. ʒ .1 to .3, spines dense, .02 to .03 long, puberulent ; stipules ovate, hirtulous, the free portion short-lanceolate ; leaflets 3 pairs, shorter than terminal spine, oblong-lanceolate, .006 to .008 long, conduplicate, appressed-silky, ending in a needle-like prickle. Axils 4-5-flowered, crowded or scattered near the tips of the twigs ; bracts broad-ovate, concave, mucronate, woolly ; calyx-teeth as long as tube — Summer — Waste fields between Edlip and Aleppo.

80. A. argyrophyllus, Boiss. et Gaill. ʒ .15 to .3 ; branches thick-set with .02 to .04 long spines. Stipules tomentellous, ovate, triangular-tapering; leaflets 3 pairs, *flat or somewhat keeled*, ovate to lenticular, .008 to .012 long, ending in a needle-like prickle, appressed-silky-canescent, as long as or shorter than terminal spine. Axils 4-5-flowered, generally loosely scattered near tips of twigs ; bracts round-ovate, boat-shaped, tomentellous ; calyx .014 long, teeth somewhat longer than tube — June — Antilebanon to Aintâb.

81. A. andrachnefolius, Fenzl. ʒ .2 to .4 ; branches short. Stipules ovate at base, short-tapering, villous ; petioles .12 to .2 long, ending in a short, tender spine ; leaflets 12-18 pairs, .005 to .01 long, ovate to obovate, elliptical, or oblong, glabrous, with the exception of a few hairs on the lower surface, mucronulate. Axils many-flowered ; heads globular to oblong, as large as a walnut or larger, overtopped by leaves ; bracts ovate-oblong, concave, rather *obtuse*, or tapering ; bracteoles 1-2, sometimes 0, very small, narrow-lanceolate, ciliate at tip ; flowers .015 long — Summer — Northern Cœlesyria to Aintâb, Marash, and northward.

82. A. Andrachne, Bge. ʒ .2 to .4 ; branches short. Stipules ovate-lanceolate, tapering, villous ; petioles .25 long, ending in a short, tender spine ; leaflets 10-15 pairs, orbicular, obovate, or oblong, .01 or more long, glabrous, mucronulate. Axils many-flowered, forming an ovate, thick head as large as an egg or larger, overtopped by leaves ; bracts oblong, *tapering ;* bracteoles 1-2, linear-lanceolate, villous ; flowers .02 long — Summer — Cœlesyria and Damascus to Aleppo and Amanus. Probably only a larger leaved and flowered form of the last.

83. A. Aintabicus, Boiss. ʒ .2 to .4, glabrescent ; branches armed with .15 long, stout, ascending spines. Stipules triangular, tapering, ciliate ; leaflets 7-8 pairs, remote, ovate to lenticular, .01 to .013 long, spiny-tipped, nerved, green, sparingly puberulent at lower surface longer than terminal spine. Axils 5-7-flowered ; heads ovate, about as large as a walnut, overtopped by leaves ; bracts broad ovate, con-

cave, acuminate, boat-shaped, nearly as long as calyx ; bracteoles narrowly oblong, conduplicate, one-fourth as long as densely crisp-woolly calyx — May — Jebel Quleib (Haurân) to Aintâb, and northward.

84. A. Seytunensis, Bge ♄ .15 to .4 ; branches *stout, crowded, thick-set with*.01 *thick*, .05 *long*, spreading spines, *dilated at base, the older blackish, the younger yellow, appressed-puberulent.* Stipules ovate, acute, glabrous, ciliate ; leaflets 5 pairs, appressed-silky, oblong to oblong-lanceolate, .01 to .013 long, prickly, flat. Axils 4-6-flowered, forming *ovate-oblong*, leafy heads, larger than a walnut ; bracts linear-boat-shaped, acute, glabrous at base, crisp-woolly above ; bractlets narrowly linear-spathulate, woolly at tip, half as long as hirsute calyx — Summer — Akherdagh and northward.

85. A. Drusorum, Boiss. ♄ *Quteit. Qutât.* .3 to .5 ; *branches straggling, prostrate or ascending*, woolly between stipules. Stipules ovate, free portion triangular-lanceolate, ciliate ; spines .06 to .1 long, *slender ;* leaflets 8-10 pairs, elliptical to ovate-oblong, flat, obtuse, .007 to .01 long, mucronate, sparingly appressed-pubescent, grey or green. Axils 2-3-flowered, forming *oblong or cylindrical, leafy spikes*, often .1 to .25 or .3 long ; bracts linear, naked at base, plumose at tip ; bracteoles unequal, two-thirds to three-fourths as long as calyx — Summer — Lebanon to Amanus and Cilician Taurus.

Var. **genuinus,** Spikes .1 to .3 long, .03 broad, cylindrical.

Var. **Maroniticus,** Boiss. Spines shorter. Heads globular to ovate and oblong — Lebanon.

86. A. Hasbeyanus, Boiss. ♄ Low. Petioles .08 to .15 long, thick, ending in a short spine ; stipules triangular-lanceolate, nerved, ciliate ; leaflets 9-10 pairs, rigid, pale green, appressed-hairy, *ovate*, .015 long, obtuse, mucronulate. Heads dense, ovate ; bracts oblong-linear, villous above, somewhat conduplicate, as long as calyx ; calyx white-villous, teeth somewhat naked at tip, one-third as long as tube — Summer —Above Hasbeyah.

87. A. deinacanthus, Boiss. ♄ .3 to .5. Petioles .15 to .3 long, stout, ending in a short, strong spine ; stipules triangular-lanceolate, nerved, ciliate ; leaflets 5-6 pairs, remote, elliptical to oblong and oblong-lanceolate, .02 to .03 long, .01 or more broad, rigid, nerved and netted-veined, glabrescent, yellow-prickly. Heads dense, ovate to oblong, .07 to .1 long, .04 to .06 broad, bracts linear, tapering, hirsute, as long as calyx ; calyx hirsute, teeth nearly naked at tip, half or more than half as long as tube — May and June — Moab and Haurân to Cœlesyria, Lebanon, Damascus, Aintâb, and northward.

88. A. dipodurus, Bge. ♄ .3 to .4 ; stem woolly. Petioles .3 long, curved, *the lower half naked*, the tip spiny, leaflets 6-8 pairs, *broad-ovate*, .025 to .035 long, .015 to .02 broad, prickly, the younger ones appressed-woolly the older glabrous, green ; stipules lanceolate, tapering. Heads ovate to oblong-cylindrical, .06 to .1 long ; bracts *oblong linear*, conduplicate, glabrous at base, woolly at back, nearly as long as calyx ; calyx densely woolly, teeth somewhat curved, rather more than half as long as tube — Summer — Aintâb.

89. A. oxyphyllus, Boiss. et Haussk. ♄ .3 to .5 ; stem woolly. Petioles .16 to .24 long, stiff, *bearing leaflets near the base,*

and ending in a long spiny tip ; stipules lanceolate, hirsute, tapering ; leaflets 6-7 pairs, *lanceolate*, *long-acuminate*, .035 long, .007 broad at base, prickly, glabrescent. Heads ovate, dense, a little larger than a hen's egg ; bracts linear, *long-tapering*, conduplicate, hirsute except at base, scarcely shorter than calyx ; calyx .02 long, villous, teeth as long as tube — Summer — Grassy places ; Aintâb.

90. A. Gaillardoti, Boiss. ♄ .3 to .4. Petioles .1 long, ending in a long, slender spine ; stipules long-tapering from a triangular base, hirsute, ciliate, leaflets 5-6 pairs, ovate-oblong, .015 to .02 long, remote, stiff, appressed-puberulent, nerved, tapering abruptly into a long prickle. Axils few-flowered, forming ovate heads larger than a walnut, at base of twigs ; bracts linear, tapering, conduplicate, appressed-hirsute toward tip, longer than calyx-tube ; calyx hirsute, teeth wavy-curved, as long as tube — Summer — Qal'at-Jendel (Hermon.)

91. A. longifolius. Lam. ♄ .3 to .4, petioles .12 to .18 long, *ending in a spine much shorter than leaflets ;* leaflets 10-14 pairs, oblong-lanceolate, .02 to .03 long, tapering into a weak prickle, glabrescent ; stipules lanceolate, villous. Head smaller than an egg, ovate-globular ; bracts *oblong-lanceolate*, *boat-shaped*, ciliate, as long as calyx ; calyx villous, teeth straight, a little longer than tube — Summer — Subalpine Hermon.

92. A. Forskahlei, Boiss. ♄ *Thimrah.* .2 to .5, appressed-canescent ; branches beset with stout, .03 long, spreading spines. Leaflets 4-5 pairs, those of the new branches remote ; axillary leaves deciduous, ending in a minute prickle, leaflets crowded ; the leaflets of both kinds of leaves *obovate-oblong*, muticous. Peduncles axillary, short, 1-2-flowered ; calyx *puberulent*, tubular, *in fruit ovate*, *about* 40-*nerved*, *teeth subulate* — March and April — Syrian Desert between Qaryetein and Palmyra to Damascus, Jordan Valley, and southward to Sinai and Egypt.

93. A. Russelii, Boiss. ♄ .2 to .4, much branched. Spines spreading, the younger ones sparingly hispid, at length glabrescent. Leaves of branches .03 to .05 long, with 4-6 pairs of leaflets, leaves of axils much shorter ; leaflets *oblong to linear-elliptical*, obtuse, mucronulate. Peduncles very short, 1-2-flowered ; calyx tubular, 10-*nerved*, reddish, sparingly appressed-hairy, *in fruit globular*, *whitish*, *glabrescent*, teeth *minute*, *triangular* — March and April — Aleppo to Aintâb, and north-eastward.

94. A. coluteoides, Willd. ♄ .1 to .3, woolly-canescent ; branches thick-set with spreading, .05 to .1 long, stout spines, the younger ones pubescent. Stipules translucent, wavy, ovate-lanceolate ; leaflets 15-20 pairs, flattish, ovate, mucronulate, the lowest .003 long, gradually diminishing toward tip of leaf. Scapes nearly as long as leaves ; racemes few-flowered, generally rather loose ; calyx appressed-woolly, tubular, in fruit ovate-globular, *red-nerved*, teeth lanceolate, one-third to one-fourth as long as tube — Summer — Alpine Lebanon and Hermon.

95. A. vaginans, DC. ♄ .3, to 4, glabrescent ; branches straight, or ascending. Stipules membranous, *sheathing*, for .01 to .02 of their length, and *adnate to petiole*, the free part lanceolate-

subulate ; leaflets 4-10 pairs, remote, oblong to oblong-lanceolate, .01 to .02 long, prickly, sparingly appressed-hairy beneath. Peduncles twice to thrice as long as leaves; heads dense, ovate, larger than a walnut ; bracts scarious, ovate, acuminate, about as long as calyx-tube ; calyx woolly, campanulate, somewhat inflated in flower, a little more in fruit ; teeth subulate, one-third as long as tube ; corolla purple, .018 long — June — Amanus to Taurus, and northward.

96. A. oocephalus, Boiss. ♃ .6 to 1, sparingly hirsute or glabrescent. Stipules *linear-setaceous* from a broader base ; leaflets 15-20 pairs, *ovate-oblong*, .025 long, .012 broad, obtuse. Heads in upper axils, *sessile*, *dense*, *ovate-globular*, in fruit as large as a hen's egg ; bracts awl-shaped, somewhat shorter than calyx ; calyx tubular-campanulate, hirsute, teeth linear-subulate, a little shorter than tube — May — Haurân to Aleppo and Kurd Dâgh.

97. A. pectinatus, Boiss. ♃ .2 to .3, hispid. Stipules large, herbaceous, triangular-lanceolate; leaflets 30-40 pairs, *pectinate*, *crowded*, oblong, obtuse, .01 to .015 long, conduplicate. Heads short-peduncled, *oblong-cylindrical*, .06 to .09 long, *loose ;* bracts awl-shaped, longer than calyx-tube ; calyx hispid, tubular, .02 long, somewhat inflated, teeth lanceolate, longer than tube; corolla yellow, turning purplish — Summer — Marash.

98. A. cucullaris, Boiss. ♃ .5 to .8, sparingly hispidulous. Stipules herbaceous, .03 to .05 long, *the lower triangular-lanceolate*, *tapering*, *the upper ovate-cordate*, *tapering ;* leaflets 15-20 pairs, *lanceolate*, .03 to .05 long, .005 broad, acute, glabrous except a few hairs along lower midrib. Heads ovate, as large as a hen's egg, longer than peduncles; calyx campanulate, hirsute, teeth subulate, longer than tube — Qaldûn (Antilebanon) and eastward.

99. A. macrocephalus, Willd. ♃ 1 or more, stem *white*, flexuous, glabrous. Stipules herbaceous, *leaflike*, broad, triangular-tapering ; leaflets 12-15 pairs, oblong-lanceolate, .03 long, obtusish, at length glabrescent. Heads globular, .05 in diameter, shorter than peduncle ; calyx hirsute, campanulate, teeth subulate, as long as tube — Summer — Amanus to Akherdagh, and northward.

100. A. Echinops, DC. ♃ 1 or more, *velvety-silky*. Stipules *membranous*, *lanceolate-linear*, .01 long ; leaflets 12-15 pairs, *ovate to ovate-oblong*, obtuse, .02 to .035 long, .015 to .02 broad. Heads 2-11 *in a sort of corymb or panicle*, *from the upper axils*, *spherical*, .04 in diameter, very dense, peduncled ; bracts boat-shaped, woolly, as long as calyx ; bracteoles *club-shaped*, longer than calyx ; calyx appressed-hirsute, teeth triangular — May to September — Fields ; Moab to Antilebanon, Cœlesyria, Aintâb, Marash, and eastward.

101. A. Kahiricus, DC. ♃ *Asabi'-el-'Arûs*. .5 to 1, *woolly-canescent ;* stems thick, decumbent, zigzag. Stipules herbaceous, *broad triangular*, acute, .007 long ; leaflets 5-9 pairs, orbicular, .02 long, often retuse, *upper surface glabrous*. *Racemes* axillary, *rather loose*, cylindrical, short peduncled; bracts 0 ; bracteoles awl-shaped, much shorter than calyx-tube ; calyx hirsute, in fruit *bladdery-inflated*, .02 long, teeth one-third as long as tube ; *standard straight*, *twice as long as calyx* — Sandy places ; Debbet-er-Ramleh, and southward and westward.

102. A. Kotschyanus, Boiss. ♃ .2 to .4, appressed-canescent, diffuse. Stipules *minute*, triangular-lanceolate, connate at base; leaflets 6-9 pairs, *linear elliptical*, about .01 long, those of lower leaves ovate-oblong. Peduncles slender, twice or thrice as long as leaf; heads ovate-globular, .02 long, in fruit oblong, loose, .04 long; bracts linear, somewhat longer than pedicel; calyx appressed-white- and black-hairy, teeth about half as long as tube; corolla twice to thrice as long as tube, *purple* — May and June — Cœlesyria, Antilebanon, and Damascus to Aleppo, Aintâb, Marash, and northward.

103. A. trifoliolatus, Boiss. ♃ .4 to .5, appressed-canescent, base woody, tortuous; stems slender, *wand-like, nearly naked.* Stipules short, *rusty-hairy*, connate; leaflets *few*, linear, *trefoil*, the petiole shorter than the leaflets, *the uppermost leaves sessile, simple.* Peduncles longer than leaves; racemes short, rather loose, ovate, few-flowered; bracts oblong-linear, twice as long as pedicel; calyx woolly-canescent, teeth lanceolate, somewhat less than half as long as tube; corolla nearly twice as long as calyx; pods oblong, .01 to .015 long, twice as long as calyx, ending in a long, incurved beak — June and July — Cœlesyria; Antilebanon.

104. A. schizopterus, Boiss. ♃ .1 to .2, green, glaucous, except the sparingly appressed- ristly, upper face of leaflets. Stipules lanceolate, tapering, hairy; leaflets 7-15 pairs, *round-ovate*, .003 to .006 long, *somewhat retuse.* Scapes shorter than leaves, procumbent, ending in racemes at length rather loose; calyx sparingly appressed-white- and black-hairy, teeth lanceolate subulate, nearly half as long as tube; standard oblong, tapering, twice as long as calyx, retuse; pods linear, .04 long, .003 broad, erect, gla rous or sparingly hairy, *mottled*, flattened, straight or somewhat incurved, cuspidate — April and May —Nusairy Mountains to Cassius, Akherdagh, and northward.

105. A. ancistrocarpus, Boiss. et Haussk. ♃ .1 to .25, appressed-bristly, canescent. Stipules trian_ular-lanceolate; leaflets 5-11 pairs, rather remote, fleshy, *obovate to elliptical*, .005 to .01 long, mucronulate, the upper face often sparingly bristly. Scapes usually shorter than leaves, ending in an oblong, loose, 5-20-flowered raceme; bracts triangular-lanceolate, twice as long as pedicel; calyx appressed-white- and black-hairy, teeth triangular-lanceolate, one-fifth as long as tube; standard strongly recurved, ovate, twice as long as calyx; pods spreading, sparingly bristly, *flattened-cylindrical*, .05 long, .004 broad, *strongly incurved* — April and May — Syrian Desert, and eastward.

106. A. elongatus, Willd. ♃ .3 to .4, appressed-canescent. Stipules triangular-lanceolate, silky; leaves .15 to .2 long; leaflets 5-9 pairs, ovate to ovate-oblong, the larger ones .015 to .02 long, acutish, mucronulate. Scapes longer than leaves; raceme many flowered; calyx white- and black-hairy, teeth one-third as long as .01 long tube; corolla yellow, standard not constricted at tip, twice as long as calyx, .02 long; pods *pendulous, ovate-oblong*, .015 long, .008 to .01 broad, ending abruptly in a straight or somewhat oblique cusp — May and June — Aintâb to Marash, and northward.

107. A. angulosus, DC. ♃ .1 to .15, appressed-yellowish-canescent. Stipules *minute*, triangular, hairy; leaflets 5-10 pairs,

elliptical to ovate, acutish, .005 to .01 long. Scapes somewhat longer than leaves ; racemes ovate-oblong, rather loose in fruit ; bracts triangular-lanceolate, one-third as long as calyx-tube ; calyx appressed-white- and black-hairy, teeth triangular, very short ; corolla yellow, .018 long, more than twice as long as calyx ; standard oblong, lanceolate, tapering at tip ; pods *spreading*, transversely wrinkled, tapering at base, *oblong-triquetrous*, .02 long, .008 broad below tip, *somewhat club-shaped*, abruptly tapering into a straight or oblique beak, *half as long as pod* — Spring — Subalpine Lebanon and Antilebanon ; Cœlesyria ; Damascus plain ; Engedi.

108. A. dictyocarpus, Boiss. ♃ .1 to .15, appressed-canescent, densely tufted from a woody rhizome. Stipules short, lanceolate, canescent ; leaflets 4-8 pairs, elliptical to ovate, obtuse, .003 to .005 long. Scapes ascending, slender, somewhat longer than leaf ; racemes short, 2-10-flowered, at length loose ; bracts oblong, as long as pedicel ; calyx appressed black- and white-hairy, teeth triangular, very short, oblique ; corolla yellowish-red, more than twice as long as calyx, .02 long ; standard ovate-oblong, *narrowed above into a short appendage ;* pods erect or spreading, netted-veined, *flattened, ovate to oblong-rhombic*, .02 long, .012 broad, with an oblique cusp — Summer — Alpine regions of Lebanon and Antilebanon.

109. A. Trachoniticus, Post. (Journal of Linnæan Society, Botany, Vol. XXIV. p. 426) ♃ .1 to .15, appressed-canescent, woody at base, branching. Stipules lanceolate-acuminate, black- and white-hairy ; leaflets 3-7 pairs, oblong to linear, acute, .01 long. Peduncles *much shorter than leaves ;* flowers 2-5, .03 long, in short racemes with zigzag axis ; bracts lanceolate, longer than short pedicel ; calyx gibbous at base, white- and black-hairy, .015 long, teeth triangular-subulate, one-sixth as long as tube ; corolla *pink*, less than twice as long as calyx ; pods *erect*, straight or slightly curved, *appressed-white-hirsute, cylindrical-terete*, .06 to .08 long, .003 thick, tapering into a short, stout beak — May — Roadsides near Sowarat-el-Kebîrî (Border of Leja); Syrian Desert.

Fig. 145.



Pod of A. Trachoniticus.

110. A. gladiatus, Boiss. ⚇ .2 to .3, appressed-canescent, woody at base ; stem slender, erect. Stipules minute, short-lanceolate, silky ; leaflets 4-8 pairs, *linear-elliptical to oblong-elliptical*, .008 to .01 long. Peduncles *twice to thrice as long as leaf;* racemes 5-12-flowered, loose; calyx black- and white-hairy, teeth triangular-subulate, one-fifth as long as .013 long tube ; corolla *livid*, yellowish-white, nearly twice as long as calyx ; pods *spreading or nodding*, linear-triquetrous, .07 to .08 long, .003 thick, tapering, appressed-white-bristly — June — Alpine Lebanon near Cedars.

111. A. sanctus, Boiss. ⚇ .1 to .4, appressed-silky, shrubby at base, stems erect, brittle, flexous. Stipules minute, triangular, black-hairy ; leaflets 5-7 pairs, oblong to linear-oblong and elliptical-oblong, .006 to .015 long. Peduncles *about as long as leaves ;* racemes loose, 5-15-flowered ; calyx black- and white-hirsute, teeth lanceolate-subulate, one-fifth to one-sixth as long as .013

long tube; corolla *yellow*, scarcely twice as long as calyx; pods *deflexed*, linear, somewhat flattened, .06 long, .002 thick, *almost semicircular*, appressed white- and black-hirsute — Spring — Damascus to Haurân, El Ghor, southern Palestine and et-Tîh.

112. A. Amalecitanus, ♃ .1, appressed-silky, shrubby at base, *tufted;* stems erect. Stipules *elongated*, yellow, 2-*toothed*, *ciliated*, *glabrous;* leaves short ; leaflets 3-4 pairs, *crowded*, *oblong*, acutish, .005 long. Peduncles somewhat longer than leaf; flowers 4-5, capitate, .025 long ; calyx at length split, loosely black-and white-hispid, teeth one-third as long as tube ; corolla * * ; immature pods oblong, sessile, acute, white-hispid, scarcely longer than calyx — Spring — About Gaza.

113. A. Camelorum, Barbey ♃ .2 to .3 or more, stem shrubby. Stipules subconnate, oblong-ovate, ciliate, mucronate, .004 long ; leaves .05 to .06 long ; leaflets 2-4 pairs, conduplicate, oblong, .008 long, .002 broad, *distant*. Flowers 6 or more in a raceme, .012 long; peduncle almost 0 ; calyx white-and black-hairy, teeth one-fifth as long as tube, half as long as pale, purplish-yellow, .03 long corolla ; ovary oblong-ovoid —Spring— Bir. Mas'ûd, at western border of et-Tîh.

114. A. angustifolius, Lam. ♃ .3 to .4, erinaceous ; branches beset with spreading, .02 to .05 long spines. Leaflets 6-10 pairs, oblong to oblong-linear, conduplicate. Peduncles much shorter than leaves ; raceme few-flowered, *capitate ;* calyx appressed-white and often black-hairy, teeth subulate, one-half to one-third as long as tube ; pod once and a half as long as calyx, oblong, somewhat triquetrous, appressed-canescent, mucronate—Summer— Alpine Lebanon and Antilebanon to Cassius and Amanus, and northward.

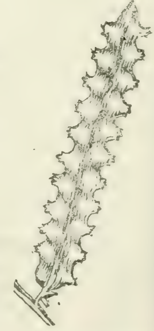
115. A. Hermoneus, Boiss. ♃ .3 to .6 densely erinaceous, thick-set with .02 to .04 long, stout spines. Leaflets 7-8 pairs, *minute*, *obovate*, conduplicate, obtuse or retuse. Peduncles shorter than leaf, ending in a short, 3-4-flowered raceme ; calyx sparingly black-hairy, teeth one-fourth to one-fifth as long as tube ; pods twice as long as calyx, oblong-cylindrical, .013 long, .003 thick, acute, mucronate, glabrous or sparingly puberulent — Summer — Alpine Lebanon and Antilebanon ; Jebel-ed-Durûz.

32. BISERRULA, L. Biserrula.

Calyx bell-shaped, nearly equally 5-toothed. Standard ovate. Wings free. Keel obtuse, somewhat shorter than wings. Pod many-seeded, linear, indehiscent, flattened contrary to partition, divided within by a very narrow, median, longitudinal septum connecting the sutures ; margin pinnate-dentate.

B. Pelecinus, L. ⊙ .3 to .4, appressed-hairy, diffuse. Stipules free, membranous, ovate ; leaflets 8-15 pairs, obovate-oblong, retuse. Peduncles nearly as long as leaves ; racemes short, somewhat capitate, few-flowered, rather loose ; corolla small, bluish — Spring — Fields ; common to 2000 m.

Fig. 146.



Pod of Biserrula Pelecinus.

33. GLYCYRRHIZA, L. Liquorice. *'Urq-es-Sûs.*

Calyx somewhat 2-lipped, upper teeth connate higher than lower. Standard narrow, wings and keel acute. Stamens diadelphous, anthers somewhat 2-valved on account of cells joined at apex. Ovary many-ovuled, style glabrous, incurved at apex ; stigma terminal, capitate. Pod leathery, oblong to linear, flattened, or necklace-like, rarely ovate, turgid, not divided within, indehiscent or somewhat dehiscent — Perennial, generally glandular herbs, with a sweet root, odd-pinnate leaves, axillary racemes or heads, and bluish or violet flowers.

1. G. glabra, L. ♃ .5 to 1, erect. Leaflets 4-7 pairs, oblong to elliptical-lanceolate, acute or obtuse; *racemes loose, shorter than leaves or a little longer;* flowers .01 long ; pods oblong to linear, .01 to .03 long, flattened, straightish — May and June — A variable species growing in waste fields and on dry hillsides, crowding out other vegetation. Widely distributed. It furnishes the officinal Liquorice.

Var. **typica,** Reg. et Herd. Nearly glabrous. Under surface of leaves glutinous. Calyx-lobes linear-lanceolate, often longer than tube. Corolla *blue.* Pod glabrous, oblong, 1-6-seeded.

Var. **violacea,** Boiss. Glabrous. Leaves glutinous. Calyx lobes triangular-lanceolate. Corolla *violet.* Pod glabrous, linear-oblong, 3-7-seeded.

Var. **glandulifera,** Reg. et Herd. More or less pubescent or glandular-asperulous. Leaves usually glandular beneath. Pods oblong, *more or less echinate-glandular,* 2-6-seeded.

2. G. echinata, L. ♃ (Turkish) *Râm-tchichêka.* 1 to 2, glabrescent, erect. Leaflets 5-6 pairs, oblong to elliptical, mucronate. Flowers *in dense,* short peduncled heads. in flower spherical, .01 in diameter, in fruit ovate-spherical.03 long; pods *obovate-oblong,* flattened, .01 long, .005 broad, 2-3-seeded, armed with long prickles — Summer — Fields; coast. This species also furnishes Liquorice.

Var. **Frearitis,** Peduncles somewhat longer. Heads oblong, looser. Pods less echinate, usually 3-seeded —Meadows near Marash.

34. GLYCYRRHIZOPSIS, Boiss. et Bal, Glycyrrhizopsis.

Calyx as in Glycyrrhiza. Wings and keel obtuse, shorter than oblong standard. Stamens as in Glycyrriza. Ovary 2-ovuled, style and stigma as in last. Pod large, oblong, somewhat flattened, dehiscent, valves leathery, twisted — Perennial, yellow-flowered herbs.

G. flavescens, Boiss. ♃ .6 to 1, pubescent, at length glabrous, erect ; stem angled, zigzag, scaly at base. Leaflets 4-7 pairs, petiolulate wedge-ovate to elliptical, obtuse, mucronulate ; stipules scarious, lanceolate. Racemes peduncled, rather dense, about as long as leaf ; flowers .015 long ; pods oblong, .03 to .04 long, .01 broad, obliquely mucronate; seeds rusty, mottled with black — April to June — Woods; Cassius and Amanus.

35. SCORPIURUS, L. Scorpiurus.

Calyx short bell-shaped, the upper teeth connate higher than the lower. Keel beaked. Pod circinnate, grooved and crested lengthwise,

more or less constricted between seeds. Cotyledons contorted — Annual herbs, with simple, entire, oblong-spathulate leaves tapering into a petiole.

1. S. sulcata, L. ⊙ .2 to .4. Prickles of outer ribs much shorter than diameter of pods ; seed scarcely striate — Spring — Fields ; coast and low lands of interior. Probably a variety of the following more common species.

2. S. subvillosa, L. ⊙ *Sillaiqah.* .2 to .4. Prickles of outer ribs about as long as diameter of pod, hooked ; seeds striate — Spring — Fields ; common.

36. HAMMATOLOBIUM, Fenzl. HAMMATOLOBIUM.

Calyx tubular-campanulate, teeth nearly equal. Keel acute. Pod linear, necklace-like, mucronate or beaked, joints elliptical, turgid, scarcely flattened, slightly reticulate — Perennial herbs with aspect of Dorycnium.

H. lotoides, Fenzl. ♃ .3, villous, procumbent or prostrate. Leaflets 5, with a very short petiole, often somewhat digitate, obovate, the lower stipuloid. Peduncles about as long as leaf, 1-3-flowered ; bract trefoil at base of nearly sessile flowers ; calyx-teeth lanceolate-subulate, somewhat shorter than tube ; corolla golden-yellow ; pods hairy, .01 to .02 long, .002 broad, of 2-8 joints, beak in the few-jointed pods, elongated — May — Cassius to Amanus, Akherdagh, and northward.

37. ORNITHOPUS, L. ORNITHOPUS.

Calyx tubular-campanulate, 5 toothed, upper teeth connate a little higher than lower. Keel obtuse. Pod linear, terete or flattened, with numerous, cylindrical or truncate-quadrate joints — Annual herbs, with long-peduncled umbels, naked or bracted at base.

1. O. ebracteatus, Brot. ⊙ .3 to .4. Leaves all petioled ; leaflets 5-6 pairs, oblong-linear. *Peduncle naked at apex ;* pods *cylindrical,* .03 long, .001 thick, ending in a somewhat incurved beak — May — Beirût.

2. O. compressus, L. ⊙ .2 to .4. Leaves except the lowest sessile ; leaflets 10-16 pairs, oblong-elliptical. Peduncle *furnished at apex with a pinnate bract, overtopping the flowers ;* pod *flattened, linear,* .04 long, .0025 broad, ending in a hooked beak — Spring — Fields ; common along coast and lower hills of coast range.

38. CORONILLA, L. CORONILLA.

Calyx short-campanulate, upper teeth connate higher up than lower. Keel acute or beaked. Pod elongated, straight or curved, terete or tetragonal, somewhat constricted at joints — Shrubs or herbs, with odd-pinnate or ternate leaves.

* *Perennials. Leaves pinnate.*

1. C. emeroides, Boiss. et Spr. ♄ .5 to 1, glabrous or sparingly appressed-hairy. Stipules minute, triangular; leaflets 2-4 pairs, obovate. Peduncles 1-3 times as long as leaves, umbellately 5-8 flowered ; *claws of petals twice as long as calyx ;* pods linear terete, .05 long,

.015 broad, striate, slightly narrowed at joints — Summer — Galilee to Lebanon, Akherdagh, and northward.

2. C. Cappadocica, Willd. ♃ .4 to .5, glaucescent, sparingly white-hairy, ascending. Leaflets 7-9, *obovate-cuneate, retuse*, the lower remote from stem. Peduncles long, 6-9-flowered ; flowers .015 long, *yellow ;* pods deflexed, curved, ending in a hooked beak — Spring — Aintâb to Akherdagh, and northward and westward.

3. C. varia, L. ♃ .3 to .5, glabrous; stems herbaceous, grooved, hollow, diffuse or ascending. Leaflets 7-12 pairs, *oblong to elliptical*, mucronate, the lowest close to stem. Peduncles longer than leaf, 15-20-flowered ; pedicels nearly twice as long as calyx ; corolla *pink, variegated with white*, .01 long, *tip of keel blackish-purple ;* pods erect or spreading, straightish, .05 long, .003 thick, joints 3-7, flattened-tetragonal — Summer — Mountains of Aintâb, and northward.

Var. **pauciflora,** Griseb. Leaflets 5-6 pairs, smaller. Peduncles longer, more slender, 5-10-flowered ; flowers smaller — Subalpine and alpine Lebanon to Amanus, Akherdagh, and northward.

* * *Annuals. Leaves pinnate. Flowers pink.*

4. C. Cretica, L. ⊙ .3 to .5, glabrous, or stems slightly hairy, diffuse or ascending. Leaflets 4-8 pairs, obovate-oblong, cuneate retuse, to obcordate. Peduncles 3-7-flowered, longer than leaves, at length elongated ; flowers .005 to .008 long ; calyx minute, teeth broad, short ; keel blackish-purple ; pods ascending, linear-tetragonal, straightish or semicircular, ending in a *sub-incurved* beak —Spring — Common along coast and in lower mountains and interior plains. Shades by imperceptible gradations into C. parviflora, Willd.

Fig. 147.



Pods of Coronilla scorpioides.

* * * *Annuals. Leaves ternate. Flowers yellow.*

5. C. scorpioides, L. ⊙ .2 to .3, glabrous, glaucous ; central stem erect, the lateral ones spreading. Leaflets fleshy, the lateral small, near the stem, the terminal .02 to .04 long, ovate, short petiolulate. Peduncles 3-4-flowered, somewhat longer than leaf ; flowers .005 long ; pods spreading, scorpiod, somewhat flattened, tetragonal, .05 to .07 long, slightly constricted between seeds — Spring — Fields ; common.

39. HIPPOCREPIS, L. Hippocrepis.

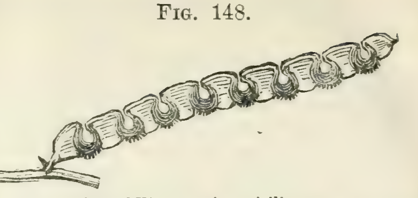
Calyx short-campanulate, the upper two teeth connate higher than the lower three. Keel tapering, beaked. Pod flattened, straight or curved, the upper margin excavated opposite each seed, separating into horse-shoe-shaped joints. Heads curved — Herbs with odd-pinnate leaves and yellow flowers.

* *Margins of sinus not ending in horns.*

1. H. unisiliquosa, L. ⊙ .2 to .4, glabrescent; stems decum-

bent, simple. Leaflets 4-7 pairs, wedge-oblong to linear, retuse. Flowers axillary, nearly sessile, single or rarely twin; pods *straight*, or *slightly curved;* rings of seeds more or less complete, more or less papillary or glabrous, sinus of seed looking toward concavity of pod — Spring — Fields; common along coast, and in lower mountains and interior plains.

Fig. 148.



Pod of Hippocrepis, unisiliquosa.

Var. **biflora,** Post. 2-flowered. Rings of seeds complete, edges overlapping — Coast. (*H. biflora, Spreng.*)

2. H. multisiliquosa, L. ⊙ .3 to .5, sparingly appressed-hairy or glabrescent, decumbent. Leaflets 4-7 pairs, oblong-linear, often retuse. Peduncles 2-8-*flowered*, about as long as leaves; *pods strongly curved*, *sometimes circular*, glabrous or scabrous-hairy at seed, sinus completely closed, *looking toward the convex margin of pod* — Spring — Fields; coast and lower mountains.

3. H. ciliata, Willd. ⊙ .2 to .4, sparingly appressed-hairy, decumbent. Leaflets 4-5 pairs, linear, truncate or retuse. Peduncles 2-5-flowered, about as long as leaves; pods curved, scabrous-hairy at seeds, *sinus looking toward concave margin of pods* — Spring — Samaria; eastern side of Dead Sea.

* * *Margins of sinus ending in more or less elongated, divergent horns.*

4. H. cornigera, Boiss. *Medahîn.* .2 to .3, sparingly appressed-hairy, decumbent. Leaflets 3-5 pairs, oblong to linear, retuse. Peduncles somewhat longer than leaf, 2-4-flowered; pods papillary-hairy or glabrescent, *scorpioid*, *with one or two circular turns*, sinus more or less closed, *looking toward the convex margin of pod* — Spring — Sandy places; south end of Dead Sea to Sinai and Egypt.

40. HEDYSARUM, L. Hedysarum. *Androsarûn.*

Calyx campanulate, 5-toothed. Standard narrow at base; wings short or elongated; keel obliquely truncate at base. Vexillar stamen free. Ovary many ovuled; style filiform; stigma somewhat sessile. Pod flattened, jointed, crenate at sutures, joints several, rarely by abortion 1, nearly round or quadrate, indehiscent — Shrubs or herbs, with odd-pinnate leaves and flowers in axillary, peduncled racemes or spikes.

* *Stipules lateral, free. Pods armed with hooked prickles.*

1. H. spinosissimum, S. et S. ⊙ .2 to .3, appressed-pubescent, decumbent. Leaflets 4-7 pairs, glabrous on upper, pubescent on lower surface, obovate to oblong-elliptical, .005 to .01 long, truncate or retuse. Peduncles longer than leaf; flowers 2-8, racemed-capitate, pink; joints of pod round, .006 in diameter, densely pubescent — Spring — Dry fields; Palestine.

* * *Stipules united, opposite the leaf.*

† *Pod unarmed, or armed with short prickles or tubercles.*

2. H. atomarium, Boiss. ♃ .3 to .6, sparingly appressed-hairy, pale green, ascending, branched. Leaflets 5-6 pairs, green, fleshy, ovate to oblong, obtuse, .02 long, .008 broad, glabrescent on upper, sparingly appressed-bristly on lower surface. Peduncles somewhat longer than leaf; racemes dense, ovate, at length elongated; corolla *purple*, .015 long; joints of pod 2-3, round-ovate, slightly netted-wrinkled, wrinkles thicker toward margin, short-hairy — June — Amanus to Aintâb, and northward.

Var. **suffruticens,** Boiss. Shrubby at base, stems shorter. Leaflets smaller, more canescent on lower surface. Calyx-teeth scarcely longer than tube.

† † *Pods beset with long bristles.*

3. H. pogonocarpum, Boiss. ♃ .2 to .4, loosely woolly-canescent, ascending. Leaflets 6-9 pairs, lenticular, obtuse, .01 to .013 long. Peduncles at least as long as leaves, often much longer; racemes oblong, at length elongated, rather loose; corolla rather *yellow*, .013 long, keel one-third longer than retuse standard, *bent beneath at less than a right angle;* pods of 1-2, elliptical, woolly-canescent joints, beset with long, reddish bristles — June — Amanus to Aintâb, Akherdagh, and northward.

4. H. pannosum, Boiss. ♃ Nearly stemless, *densely pannous.* Leaflets 6-9 pairs, ovate to oblong-elliptical, .013 to .02 long, obtuse or acutish. Peduncles rather thick, twice as long as leaves; racemes loose, often .13 to .25 long; standard retuse, a little shorter than keel; joints of *pannous* pod 1-2, ovate, beset with long, reddish bristles — May and June — El-Jebel-el-Abiad near Palmyra; Aintâb.

41. ONOBRYCHIS, Gærtn. ONOBRYCHIS.

Teeth of bell-shaped calyx nearly equal. Wings short, keel obliquely truncate at apex, as long as or longer than standard. Vexillar stamen free at base, connate with others at middle. Ovary 1-3-ovuled; style filiform, stigma terminal. Pod exserted, sessile or stipitate, flattened, not jointed, half-round, circinnate, leathery, with pitted disk, and crested, often spiny margin — Herbs, rarely shrubs, leaves usually odd-pinnate, flowers in axillary pedunculated spikes or racemes.

* *Annuals.*

1. O. Crista-Galli, L. ⊙ .2 to .4, appressed-canescent, diffuse or ascending. Leaflets 5-10 pairs, oblong-cuneate to obovate-oblong, retuse to obcordate, mucronate. Peduncles 1-3-flowered, somewhat shorter than leaf; calyx-teeth about as long as pale pink corolla; pod hairy, semi-orbicular, .015 long, with pitted and usually prickly disk, and crest divided into 3-4, lanceolate, acute, toothed lobes, often furnished on both sides with an accessory crest, with shorter lobes — Spring — Fields; common throughout.

Var. **Gærtneriana,** Post. Lobes of crest obtuse. Corolla deep pink, a little longer than calyx — Common with type. (O. Gærtneriana, Boiss).

Var. **lenticularia,** Post. Leaflets *oblong-lenticular*, acute, long-mucronate — Base of Carmel.

2. O. æquidentata, S. et S. ⊙ .2 to .4, appressed-bristly, canescent, or nearly glabrous, erect or ascending. Leaflets 6-8 pairs, oblong-elliptical obtuse to linear acute. Peduncles much longer than leaf, remotely 3-9-flowered ; corolla purple, .01 long, longer than calyx ; pod glabrous or appressed-bristly, semi-orbicular, .012 long, *unarmed or more or less short-prickly on the pitted disk*, crest as long as disk or shorter, separated into 5-6, *triangular*, acute, entire, *nearly equal* teeth — Spring — Carmel to Gilead, Aleppo, Marash, and northward.

3. O. Caput-Galli, L. ⊙ .2 to .4, sparingly appressed-hirsute, erect or diffuse. Leaflets 5-7 pairs, oblong to oblong-linear or cuneate. Peduncles loosely 3-7-flowered, as long as or longer than the leaves ; corolla pink, .006 long, about as long as calyx ; pod pubescent, semi-orbicular, .008 long, disk pitted, *and densely beset with long prickles*, crest divided into *numerous*, *triangular-subulate* prickles, somewhat longer than those of disk — Spring — Hills and sandy plains ; coast and interior.

* * *Perennials.*

† *Corolla glabrous, deciduous soon after flowering.*

‡ *Unarmed. Flowers in long, spiked racemes.*

4. O. megataphros, Boiss. ♃ .3 to .4, appressed-hirsute ; stems wavy. Leaflets 4-6 pairs, oblong-elliptical, obtuse. Peduncles much longer than leaf, at length somewhat forked into elongated, loose spikes ; corolla pink ; pod 7-8 pitted at disk, the marginal row much deeper ; crest *triple, the middle one scarcely narrower than disk, divided into* 7-9 *lanceolate-subulate prickles, the lateral divided into* 5-6, *subulate, appressed to middle crest*, and shorter than it — Spring — Aintâb, and eastward and northward.

5. O. sativa, L. ♃ Sainfoin. .3 to .5, appressed-hairy or glabrescent, ascending or erect. Leaflets 6-12 pairs, elliptical to elliptical-linear. Peduncles at length much longer than leaves ; spikes oblong, dense ; corolla pink, striate, .01 long ; pod semi-orbicular, .008 long, unequally pitted at disk, unarmed or prickly tubercled ; crest denticulate-prickly — Spring — Fields ; cultivated and escaped from cultivation.

Var. **montana,** Boiss. Stems more diffuse. Leaflets obovate-cuneate to obovate-oblong. Spike shorter. Teeth of crest slender, longer — Antilebanon to edge of Syrian Desert, Akherdagh, and northward.

6. O. gracilis, Bess. ♃ .4 to .6, appressed-canescent, ascending ; stems slender. Leaflets 5-9 pairs, elliptical, those of upper leaves linear-lanceolate. Peduncles slender, at length many times longer than leaf ; spikes rather loose, elongated ; corolla pink, .007 long ; pod obovate, deeply and unequally pitted and *nearly unarmed at disk*, crest narrow, armed with 5-6 prickles — May and June — Dry hills ; coast and tablelands.

7. O. Cadmea, Boiss. ♃ .3 to .5, appressed-silky, canescent, ascending. Leaflets 10-12 pairs, oblong, those of upper leaves linear-

elliptical, mucronate. Spikes oblong, rather loose, elongated in fruit; corolla pink, nearly .01 long; pods obovate-orbicular, .005 long, deeply and unequally pitted at disk, *with* 4-5 *prickles on both sides*, and crest narrower than disk, *armed with* 3-4 *triangular prickles* — May and June — Dry hills; Moab and Ḥaurân, Damascus, Antilebanon, and northward.

8. O. Kotschyana, Fenzl. ♃ .3 to .6, appressed hirsute; stems erect or procumbent, wavy above. Leaflets 3-7 pairs, oblong-elliptical to linear, striate. Peduncles somewhat forked; spikes at length very long, loose; corolla light pink, .008 to .01 long; pods obovate, .006 long, with a deeply and unequally few-pitted, unarmed or 2-3-prickly disk; crest armed with 2-3, triangular-subulate prickles, *the apex often truncate*, 2-*horned* — May and June — Lebanon and Antilebanon to Damascus, Aleppo, Palmyra, and eastward.

‡ ‡ *Thorny shrubs with flowers in short racemes.*

9. O. cornuta, L. ♄ .3 to .5, intricately branched, *thick-set with stout, spinescent petioles*, more or less canescent-silky or woolly. Leaflets 2-4 pairs, oblanceolate to linear, acute. Peduncles few-flowered; corolla pink, .01 long; pod twice as long as calyx, appressed-hirsute or glabrescent, flattened, semi-orbicular, unarmed and somewhat unequally pitted at disk, crest entire, much narrower than disk — Summer —Alpine and subalpine Lebanon and Antilebanon; Akherdagh.

† † *Standard pubescent or silky. Petals long persistent.*

‡ *Pod circinnate. Pits of narrow crest quadrate or pentagonal.*

10. O. Olivieri, Boiss. ♃ .3 to .5, woolly-canescent to puberulent-villous; stems branching from neck, procumbent, flexuous. Leaflets 2-4 pairs, remote, round to ovate and ovate-oblong, *appressed-puberulent on both sides*, mucronate, the lowest leaves sometimes simple. Racemes loose, much longer than leaves; corolla whitish-yellow, striate, .02 long; *wings as long as calyx*, oblong-triangular, *somewhat curved upward, obtuse, with deflexed auricle;* pods *obovate*, .01 long, fleecy, pitted and slightly prickly — April — Fields about Palmyra, and eastward.

11. O. Ptolemaica, Del. ♃ *Khansar-el-'Arûs.* .1 to .25, villous; stems ascending from neck. Leaflets 4-8 pairs, oblong to elliptical, glabrous at upper, loosely hirsute at lower surface. Racemes long, many flowered; corolla yellow, .015 long, rusty-lined; wing not longer than calyx-tube, horse-shoe-shaped; pod .01 long, .007 broad, densely woolly, pitted and short-prickly at disk and margin — April and May — Gaza and south end of Dead Sea to Sinai and Egypt.

12. O. Gaillardoti, Boiss. ♃ .1 to .25, loosely villous; stems thick, erect. Leaflets 5-6 pairs, ovate, obtuse, glabrous on upper, appressed-hirsute on lower surface. Peduncles thick; racemes very long; corolla yellow, purple-lined; pod densely white-woolly, sparingly short-prickly at disk; crest narrow, *very short-denticulate* — May — Waste fields; Hamath to Palmyra; Damascus.

‡ ‡ *Pod circinnate. Areolæ of broad crest linear-rectangular.*

13. O. aurantiaca, Boiss. ♃ .3 to .6; stems thick, ascending, hirsute with spreading or deflexed hairs. Leaflets 4-5 pairs, *ovate to*

oblong, .03 to ,04 long, obtuse, mucronulate, glabrous at upper, and at length at lower surface. Racemes .3 to .4 long; *corolla orange-colored*, .02 long; pod .025 long, .02 broad, *glabrescent or puberulent*, margin scabrous with very short, triangular teeth — June — Antioch to Amanus, Aintâb, and north-eastward.

Var. **velutina,** Post. Disk of pod velvety-pannous; crest puberulent — Amanus.

14. O. galegifolia, Boiss. ♃ .3 to .6; stems thick, ascending, glabrescent or sparingly hirsute. Leaflets 5-6 pairs, *oblong*, .03 to .04 long, glabrous at upper, pubescent at lower surface. Racemes .3 to .4 long; corolla yellow, .02 long; pods .02 long, .015 broad, *densely wooly*, margin denticulate — June — Aintâb, and north-eastward.

‡ ‡ ‡ *Pods semi-orbicular, the seed-bearing margin straight, with a cup-shaped cavity at middle; disk with one large, oblong pit surrounded by several smaller ones; crest broad, prickly margined.*

15. O. hemicycla, Blanche. ♃ .2 to .4, villous. Leaflets 8-10 pairs, *obovate*, .005 *long*, *retuse*, mucronulate, *appressed-hirsute at both surfaces.* Racemes few-flowered, short; corolla .01 to .014 long — May and June — Bludân (Antilebanon); Hamath to Palmyra.

42. ALHAGI, Desv. ALHAGI. *'Aqûl.*

Calyx bell-shaped, 6-toothed. Standard obovate; wings oblong-falcate, somewhat shorter than the gradually incurved, obtuse keel. Vexillar stamen free. Ovary nearly sessile, many-ovuled; style filiform, incurved; stigma small, terminal. Pod nearly terete, sparingly hairy or glabrous, indehiscent, irregularly necklace-shaped, joints not separating — Many-stemmed, much-branched shrubs, thickly beset with axillary spines, arising from abortive peduncles. Leaves all simple, obovate-oblong, entire; stipules small, subulate, distinct.

* *Ovary silky.*

1. A. Maurorum. D.C. ♄ .6 to 1; twigs and spines slender, somewhat hirsute. Calyx appressed-hairy, teeth triangular-ovate, obtuse; pod sparingly hairy or glabrous, thick, spongy, often obsoletely constricted between seeds — Summer — Waste places; common throughout.

* * *Ovary glabrous.*

2. A. Camelorum, Fisch. ♄ .6 to 1, sparingly hirtulous or glabrescent. Calyx glabrescent, teeth short-triangular; pod *glabrous*, the upper border straight, the lower strangulated, sometimes by abortion 1-seeded — Summer —

Var. **Turcorum,** Boiss. Calyx-teeth acuter than in type — Coast and interior.

FIG. 149.



Pods of A Camelorum, var. Turcorum.

43. CICER, L. CHICK-PEA. *Hummus.*

Calyx-tube oblique or gibbous behind; teeth lanceolate, acute. Standard ovate or orbicular; wings free. Style filiform, not bearded; stigma terminal. Pod turgid. Radicle straightish — Herbs or shrubs

generally glandular-pubescent, leaves odd-pinnate.

* *Annuals.*

1. C. pinnatifidum, Jaub. et Sp. ⊙ .05 to .1, glandular-hirsute. Leaflets 3-4 pairs, minute, wedge-obovate to oblong, *deeply dentate-incised or pinnatifid;* stipules much shorter than petiole, dentate or pinatipartite, the uppermost lanceolate. Flowers violet, .007 long; pod ovate, .01 to .014 long, 1-3-seeded — Spring — Hillsides; rare.

2. C, arietinum, L. ⊙ Chick-Pea. *Hummus.* .3 to .4, glandular-hirsute, erect. Leaflets 3-8 pairs, oblong, serrate; stipules semi-sagittate, deeply 2-3-fid. Flowers bluish to white, .005 long; pod ovate-oblong, .02 long, 1-2-seeded — Spring — Cultivated everywhere. The roasted seeds are known as *Quḍâmi.*

* * *Perennials.*

3. C. ervoides, Sieb. ♃ .1 to .3, minutely glandular-hairy; rhizome thickish, producing filiform, naked trunklets, and dwarf, slender stems. Leaflets 1-3 pairs, small, cuneate, 3-5-fid, *fan-shaped,* prominently nerved; stipules half-ovate, unequally toothed or cut. Flowers violet, .007 long; pods ovate-rhomboid, .01 long, 1-2-seeded — Summer —

Var. **Libanoticum,** Boiss. Stems short, densely leafy; stipules as long as or longer than short petioles — Alpine summits of Lebanon and Antilebanon.

44. VICIA, L. Vetch. *Lubiyah. Kirsenneh.*

Calyx-tube usually oblique at base, teeth equal or unequal. Standard usually notched, obovate or oblong; wings adherent to keel. Mouth of staminal tube oblique. Style equally hairy all around near its tip, or bearded with a cluster of hairs near tip, or rarely glabrous; stigma terminal. Pod more or less flattened, 2-many-seeded — Annual or perennial herbs, with abruptly pinnate, cirrhose or aristate leaves, rarely odd-pinnate.

* *Flowers* 1-2, *nearly sessile in axils, rarely racemed.*

† *Pod not denticulate at sutures. Leaves tendril-bearing.*

‡ *Hilus of seed opposite radicle. Corolla yellow.*

§ *Standard hirsute.*

1. V. hybrida.

§ § *Standard glabrous.*

2. V. lutea, 3 sericocarpa, 4 galeata, 5 Noeana.

‡ ‡ *Hilus of seed near radicle.*

§ *Calyx regular. Corolla purple or violet.*

¶ *Seeds smooth.*

6. V. sativa, 7 augustifolia.

¶ ¶ *Seeds tubercled. Tendril simple or forked.*

8. V. lathyroides, 9 cuspidata.

§ § *Calyx irregular, upper teeth connivent. Corolla violet or yellow.*

10. V. mollis, 11 peregrina, 12 Michauxii, 13 Aintabensis.

† † *Pod denticulate at sutures. Lower leaves destitute of tendrils.*

14. V. Narbonensis, 15 serratifolia.

* * *Flowers racemed, rarely solitary, more or less long-peduncled.*

† *Perennials. Leaves tendril-bearing* (*except* 17 *usually odd-pinnate*).

16. V. Cassubica, 17 canescens, 18 gregaria, 19 Cracca, 20 tenuifolia.

† † *Monocarpic. Leaves tendril-bearing* (*except* 28 *ending in a mucro.*)

‡ *Style flattened. Racemes many flowered* (*in* 25, *2-4-flowered*).

21. V. Cassia, 22 calcarata, 23 varia, 24 villosa, 25 Palæstina.

‡ ‡ *Style filiform. Racemes 2-6-flowered* (*flowers in* **26** *solitary.*)

26. V. bombycina, 27 hirsuta, 28 Ervilia, 29 gracilis.

1. V. hybrida, L. ⊙ .15 to .4, or more, appressed-hairy, diffuse or climbing. Leaflets 5-7 pairs, obovate, obtriangular, obcordate, and oblong, retuse ; stipules minute, semi-hastate, the upper lanceolate. Flowers solitary ; corolla yellow, sometimes purple-veined, .025 long ; pods deflexed, oblong-rhombic, .04 long, .01 broad, flattish, hirsute with hairs scarcely tubercled at base — Spring — Fields ; common throughout.

Fig. 150.



Pod of V. hybrida.

2. V. lutea, L. ⊙ .15 to .3, hairy, stems weak, ascending. Leaflets 6-8 pairs, *oblong-linear to linear, obtuse,* mucronate; stipules minute, obtriangular, 2-parted. Flowers solitary, rarely twin, corolla yellow or purplish, .015 to .02 long ; pod stipitate, flattened, oblong-rhombic, .03 long, *hirsute with hairs arising from a well-marked tubercle* — Fields —

Var. **hirta,** Boiss. More densely hairy ; stems firmer, more erect ; corolla paler yellow or purplish — Syrian coast.

3. V. sericocarpus, Fenzl. ⊙ .2 to .5, appressed-hairy, stems diffuse or climbing. Leaflets 5-8 pairs, linear to wedge-obovate, truncate to retuse or obcordate, mucronate ; stipules minute, semi-hastate, the lower denticulate at base. Flowers solitary, rarely twin ; corolla yellow, .02 to .025 long ; pods stipitate, pendulous, oblong-rhomboid, .02 to .04 long, beaked, turgid, *appressed-silky with non-tubercled hairs* — Spring — Fields common.

Var. **microphylla,** Boiss. Leaflets minute, obovate-cuneate ; calyx-teeth short — Antilebanon plateau to Aintâb.

4. V. galeata, Boiss. ⊙ *'Udaisah.* .3 to .6, or more, glabrous, *climbing.* Leaflets 4-6 pairs, cuneate-obovate to oblong, truncate or retuse ; stipules very small, ovate, acute. Racemes short-peduncled, 2-4-flowered, much shorter than leaf ; corolla *pale yellow,* .025 long ; pod glabrous, flattened, netted, stipitate, oblong, .03 long, .008 broad, acute, upper margin straightish — Spring — Moist hedges ; common.

5. V. Noeana, Rent. ⊙ (Turkish) *Punjah-Tchichêka.* .3 to .4, pubescent ; stems striate, somewhat climbing. Leaflets 5-7 pairs obo-

vate to oblong and linear, .02 to .03 long, truncate or retuse, mucronate; stipules minute, semi-hastate, the upper triangular. Racemes 2-4-flowered; *calyx violet*, corolla yellow, *at length coppery*, .02 long, pod glabrous, oblong, flattened — May — Hedges and fields; between Ḥadîdah and Ḥems; Aintâb, and northward

6. V. sativa, L. ⊙ *Baqiyah.* .3 to .6, pubescent, climbing. Leaflets 6-7 pairs, obovate to oblong, truncate or retuse; stipules semi-hastate, dentate, rarely entire. Flowers 1-2; corolla *violet*, .02 long; pod pubescent, yellow or rusty-colored, linear, .04 to .06 long, .005 to .008 broad, more or less compressed, *torulose* — Spring — Cultivated everywhere as fodder, and sub-spontaneous.

Var. **glabra,** Post. Glabrous. Flowers solitary. Pods glabrous, turning black — Mountains north of Beilân.

7. V. augustifolia, Roth. ⊙ .3 to .5, sparingly pubescent, erect or climbing. Leaflets 4-7 pairs, lower obovate, retuse, the others *oblong-linear to linear*, retuse or acute; stipules semi-hastate, *deeply dentate.* Flowers 1-2; corolla *violet;* pods linear, .04 to .05 long, .006 broad, pubescent or glabrous — Spring —Common in fields.

Var. **albiflora,** Boiss. Flowers white.

Var. **cordata,** Boiss. Some or all of the leaflets obcordate or obcuneate — Jebel Qaisûn (Damascus), and eastward.

Var. **amphicarpa,** Boiss. Leaflets cuneate to linear. Some of the branches bearing flowers without corollas, and white, often ovate, 1-seeded pods — Southern Palestine.

8. V. lathyroides, L. ⊙ .1 to .2, velvety-hairy, ascending. Leaflets 2-4 pairs, the lower obovate-oblong, truncate or retuse, mucronate, the upper linear, acute, mucronate; stipules semi-sagittate, entire. Flowers minute, axillary, solitary, nearly sessile; pods linear, somewhat flattened, .02 to .03 long, .003 to .004 broad, tapering-mucronate — Spring — Djurd Ḥadath; woods of Gilead.

9. V. cuspidata, Boiss. ⊙ .1 to .2, hairy, ascending. Leaflets 4-5 pairs, those of lower leaves obcordate, or obovate-cuneate, retuse, those of the upper lanceolate-linear, tapering into a long cusp; stipules semi-ovate, the upper semi-sagittate. Pods linear, somewhat flattened, .04 long, .005 broad, long-beaked — Jebel 'Antar (Antilebanon); Southern Palestine. Probably only a variety of the last.

10. V. mollis, Boiss. et Haussk. ⊙ .2, *villous*, erect. *Lower leaves ending in a mucro*, upper in a simple tendril; leaflets 4-6 pairs, those of lower leaves cuneate, of upper linear-cuneate, retuse, mucronate; stipules semi-sagittate, entire. Peduncles 2-3-flowered; corolla .01 long, *rusty-yellow;* pods stipitate, flattish, oblong, .02 to .025 long, appressed-hirsute — March — Fields; Aleppo.

11. V. peregrina, L. ⊙ .2 to .4, appressed-puberulent; stems slender, procumbent or erect. Leaflets 3-5 pairs, linear, tapering at base, truncate or retuse, mucronulate; stipules minute, obtriangular, 2-parted into subulate divisions. Peduncles 1-flowered; corolla *purple*, .015 to .02 long; pods stipitate, flattened, appressed-hairy, oblong, .03 long, .006 broad, short-beaked — Spring — Fields; common.

Var. **parviflora,** Post. Flowers .01 long — Woods; Gilead.

Var. **glabrescens,** Post. Flowers .01 to .02 long, pods glabrous, or glabrescent.

12. V. Michauxii, Spreng. ⊙ .3 to .4, sparingly appressed-puberulent, decumbent or climbing. Leaflets 4-7 pairs, linear, tapering at base, truncate or retuse, mucronulate ; stipules minute, semi-hastate, the upper short-lanceolate. Peduncles 1-flowered ; corolla *light yellow*, .015 long; pods short-stipitate, .03 long, .008 broad, appressed-pubescent; seeds 2-3, *large*, *bean-shaped*, .006 *to* .001 *long*, flattened — Spring — Fields ; Aleppo ; Galilee.

Var. **stenophylla,** Boiss. Leaflets short-linear, acute — Antilebanon.

13. V. Aintabensis, Boiss. et Haussk. ⊙ .3 to .4, appressed-puberulent, climbing. Leaflets 5-7 pairs, small, obtriangular to linear-cuneate; stipules minute, semi-hastate, the upper triangular-lanceolate. Peduncles 1-flowered ; corolla yellow, .01 to .015 long; pods short-stipitate, appressed-hairy, *at length glabrescent*, flattened, oblong-rhombic, .03 long, .008 broad, seeds 5-6, *globular-flattened*, .003 *to* .004 *in diameter* — Spring —Fields ; Aintâb ; Beirût ; Galilee ; Samaria.

14. Narbonensis, L. ⊙ *Nu'mâni-barri. Fûl-Iblîs. Bakher.* .3 to.4, pubescent ; stem thick, simple. Lower leaves of one pair of large, obovate leaflets, upper of 2-3 pairs, elliptical, *entire;* stipules large, semi-orbicular, dentate. Peduncles 1-2-flowered, very short ; corolla purplish-violet ; pods glabrous, oblong, .04 long, .01 broad, beak short, incurved — Spring — Fields ; common.

Var. **pilosa,** Post. Leaves all of one pair. Pods .05 long, .012 broad, *beset with hairs tubercled at base* — Woods near es-Salt (Moab).

15. V. serratifolia, Jacq. ⊙ .3 to .5, somewhat hairy, erect ; stem simple or branching from base. Lower leaves of 1 pair of obovate-cuneate leaflets, the upper of 2-3 pairs, obovate-oblong, *all serrate;* stipules large, semi-ovate, dentate. Peduncles 1-2-flowered, short ; corolla purplish-violet ; pods oblong, .03 to .04 long, .008 broad, beak short, incurved — Spring — Fields ; Ḥaurân ; 'Akkar.

16. V. Cassubica, L. ♃ Glabrous or somewhat hairy ; root creeping, stoloniferous ; stems erect, wavy, somewhat climbing. Tendril branching, leaflets 10-12 pairs, oblong to elliptical-linear, obtuse, .01 to .02 long ; stipules semi-hastate, entire. Racemes many-flowered, shorter than leaf; pods sub-rhombic, 1-2-seeded, flattened — Cassius, Amanus, and northward.

17. V. canescens, Labill. ♃ .4 to .5, many stemmed, *densely woolly*, erect. Leaves odd-pinnate, *the petiole of the upper ones sometimes ending in a short, incurved tendril;* leaflets 8-12 pairs, crowded, linear-elliptical, obtuse or acutish; stipules large, *lanceolate-sagittate. Racemes* dense, nearly as long as leaf ; corolla blue ; pods *woolly*, stipitate, oblong, .03 long, .008 broad — Summer — Top of Lebanon above Cedars.

Var. **retusa,** Boiss. Leaflets retuse — Mountains of northern Syria.

18. V. gregaria, Boiss. et Held. ♃ .5 to 1, *hirsute*, glaucescent, many-stemmed, erect. Leaves odd-pinnate or ending in short

tendrils; leaflets 8-10 pairs, oblong-obtuse to lanceolate-linear and linear, acute; stipules large, semi-sagittate. Racemes one-sided, rather dense, as long as leaves; corolla blue to white, .02 long; pod *glabrous*, or somewhat hirsute — Summer — Top of Akherdagh, and northward.

19. V. Cracca, L. ♃ Appressed-hairy, climbing, often 1 to 2 high. Leaflets 9-10 pairs, oblong to lanceolate and linear; stipules semi-sagittate, the upper lanceolate-linear. Racemes dense, many-flowered, as long as leaf or longer; corolla blue, .012 to .015 long, *blade of standard as long as claw;* pod oblong; hilus occupying one-third of periphery of seed — June — Cassius to Aintâb, Marash, and northward.

20. V. tenuifolia, Roth. ♃ Appressed-hirsute; stems rigid, climbing, often 2-3 tall. Leaflets 9-10 pairs, lanceolate; stipules semi-hastate. Racemes many-flowered, longer than leaf; corolla pale blue, .01 long, *blade of standard twice as long as claw;* stalk of oblong-rhombic .025 long, .008 broad; pod shorter than calyx-tube; hilus occupying one-fourth to one-fifth of periphery of seed — Spring and Summer —

Var. **stenophylla,** Boiss. Leaflets linear to linear-lanceolate. Racemes looser — Bushy places; common in mountain regions.

21. V. Cassia, Boiss. ⊙ Glabrescent or sparingly hirtulous; stem *tall, climbing, tender.* Leaflets 6-7 pairs, rather remote, linear-elliptical, .01 to .013 long, .003 to .005 broad, truncate or retuse; stipules minute, the lower stipitate, semi-sagittate, the upper lanceolate. Racemes loose, 5-6-flowered, somewhat shorter than leaf; pedicels slender, as long as calyx-tube; pods glabrous, stipitate, oblong-rhombic, .025 long, .005 broad, tapering into a beak — June — Woods; Cassius.

22. V. calcarata, Desf. ⊙ *'Udeis. Jilbân. Khârig.* .5 or more, sparingly pubescent, *ascending or erect, often rather rigid.* Leaflets 5-8 pairs, linear-oblong to linear, obtuse; stipules small, semi-hastate, 2-parted. Racemes shorter than leaf, 4-10-flowered; corolla pale violet; pods short-stipitate, glabrous, flattened, oblong, .04 long, .01 broad, beak short, curved — Spring — Fields.

Var. **cinerea,** Boiss. Appressed grey-hairy; leaflets linear; flowers, pods and seeds smaller than in type — Damascus; Gaza.

23. V. varia, Host. ⊙ ② .3 to .5, *appressed-hirsute,* prostrate or climbing. Leaflets 6-8 pairs, linear-oblong to linear, obtuse or acute. Racemes many-flowered, longer than leaf; corolla violet, .015 long; pods long-stipitate, *oblong-rhombic,* .02 to .03 long, .008 to .01 broad, short-beaked — Spring — Coast.

24. V. villosa, Roth. ⊙ ② .3 to .5 or more, *villous,* climbing. Leaflets 6-10 pairs, linear to linear-oblong, obtuse or acute. Racemes 8-10-flowered, longer than leaf; corolla violet, .015 long; pods stipitate, *oblong,* .03 long, .01 broad, short-beaked — Coast. Doubtfully separated from last.

Var. **latifolia,** Post. Leaflets oblong, the lower .005 broad — Around Gaza.

25. V. Palæstina, Boiss. ⊙ .5 or more, sparingly appressed-hairy ; stems slender, climbing. Leaflets 5-9 pairs, linear, acute or obtuse ; stipules semi-hastate, the upper lanceolate. Racemes 2-10-flowered, peduncle muticous, shorter than leaf ; corolla blue, .008 to .012 long ; pods glabrous, stipitate, flattened, oblong-rhombic, .02 long, .007 broad, 2-4-seeded, torulose — Spring — Rocky places ; common.

26. V. bombycina, Stapf. ⊙ .2 to .4, pubescent, *ascending.* Leaflets 6-8 pairs, *lenticular*, mucronate, .005 to .01 long ; stipules semi-hastate. Flowers solitary ; calyx divided almost to base into *lanceolate-subulate* lobes ; corolla pale yellow, striate, .008 long ; *pods pannous, cocoon-like*, oblong-rhombic, .02 long, .008 broad—Spring — Aintâb, and eastward and northward.

27. V. hirsuta, L. ⊙ .2 to .4, hirsute or glabrescent, flaccid, climbing. Leaflets 8-10 pairs, oblong-linear, obtuse or retuse; stipules semi-sagittate, sometimes 2-3-fid at base, the upper lanceolate. Peduncles 2-6-flowered, mucronate or muticous, *as long as leaves or shorter ;* corolla pale blue, .003 to .004 long ; pods oblong-rhombic, .008 long, .003 broad, 2-seeded — May and June — Lebanon ; Cassius.

28. V. Ervilia, L. ⊙ *Kirsenneh.* .2 to .4, appressed-pubescent ; stems erect, firm. Leaflets 8-12 pairs, oblong, retuse ; stipules semi-hastate, incised-dentate. Peduncles 2-4-flowered, mucronate, shorter than leaf ; corolla violet, .01 long, striate ; pod oblong-linear, .02 long, .005 broad, 3-4-seeded, *torulose* — Spring — Cultivated everywhere for fodder.

29. V. gracilis, Loisel. ⊙ .3 to .4, glabrescent, slender, ascending or climbing. Leaflets 3-4 pairs, oblong-elliptical to linear, acute ar obtuse ; stipules semi-hastate, entire. Peduncles filiform, 2-5-flowered, aristate, *twice as long as leaf ;* calyx less than half as long as bluish, .007 long corolla ; pods linear, .015 long, .003 broad, 5-6-*seeded* — Spring — Coast.

45. ERVUM, L. Lentil.

Calyx-teeth long, nearly equal. Standard obovate. Wings adherent to keel. Mouth of staminal tube oblique. Upper border of style flattened at back, and bearded, lower smooth. Pod flattened, short, 1-2-seeded — Small-flowered annuals, differing from the small-flowered Viciæ only in the style. Flowers less than .01 long.

1. E. Lens, L. ⊙ Lentil. *'Adis.* .3, pubescent, erect. Upper leaves tendril-bearing ; leaflets 5-6 pairs, oblong to oblong-linear ; stipules lanceolate, entire. Peduncles 1-4-flowered, aristate, about as long as leaf ; calyx-teeth subulate, as long as white, violet-striped corolla ; pod ovate-rhombic, .01 long, .007 broad, seeds lenticular — Spring — Cultivated everywhere for its nutricious seeds, which formed the basis of Esau's Pottage.

2. E. Orientale, Boiss. .1 to .3, appressed hirsute, erect or ascending. Leaves ending in a mucro or simple tendril ; leaflets 3-7 pairs, ovate to oblong-elliptical and linear ; stipules lanceolate-linear, acute, entire. Peduncles 1-3-flowered, somewhat longer than leaf ; calyx-teeth subulate, as long as or longer than pale blue, .005 long

corolla ; pods glabrous, obovate-rhombic, .013 long, .008 to .01 broad — Spring — Stony places ; Moab to Antilebanon, Damascus, Aleppo, Aintâb, Marash, and northward.

Var. **brachycalyx,** Post. Calyx-teeth half to two-thirds as long as corolla — Aintâb to Marash.

3. E. Lenticula, Schreb. ⊙ .2 to .4, appressed-puberulent ; stems slender, erect. Petiole ending in a mucro, and sometimes in upper leaves in a simple tendril ; leaflets 2-4-pairs, oblong to linear, mucronate ; stipules semi-hastate to lanceolate, entire, or rarely toothed toward base. Peduncles 1-2-flowered, muticous or short-mucronate, *filiform, much shorter than leaf ;* calyx-teeth capillary, somewhat shorter than .003 long, bluish corolla ; pods pubescent, obovate-rhomboid, .007 long, .004 broad — Grassy places ; coast and interior. Rather rare.

Faba vulgaris, L. The Horse-bean, *Fûl,* is extensively cultivated, and eaten by the people of Syria and Egypt.

46. LATHYRUS, L. Vetchling. Everlasting Pea.

Standard broad-obovate to orbicular. Mouth of stamen-tube not oblique. Style flattened, sometimes twisted, bearded near tip. Otherwise as in Vicia — Annual or perennial herbs with abruptly or odd-pinnate leaves — composed of 1 pair of leaflets, or with leaf-like petioles destitute of leaflets.

* *All the petioles ex-stipulate, leaf-like, only the upper bearing leaflets.*

1. L. Ochrus.

* * *All the petioles stipuled, tendril-like, destitute of leaflets.*

2. L. Aphaca, 3 stenolobus.

* * * *All the petioles leaf-like, but destitute of leaflets.*

4. L. Nissolia.

* * * * *All the petioles bearing one pair of leaflets.*

† *Sparingly puberulent or glabrous annuals.*

‡ *Pods glabrous or slightly hairy.*

5. L. annuus, 6 Cicera, 7 amœnus, 8 stenophyllus, 9 marmoratus, 10 sativus, 11 erectus.

‡ ‡ *Pods ciliate.*

12. L. blepharicarpus.

‡ ‡ ‡ *Pods tubercular-hirsute. Petioles cirrhose. Peduncles elongated.*

13. L. chrysanthus, 14 chloranthus.

† † *Perennials. Petioles cirrhose.*

15. L. tuberosus, 16 pratensis.

1. L. Ochrus, L. ⊙ .3 to .6, glaucescent ; stems winged, prostrate or climbing. Petioles decurrent, winged, oblong, .02 to .07 long, the lower acute, muticous, *the middle forked at tip, with awns or tendrils at fork and tips,* the upper bearing 1-5 leaflets. Peduncles 1-flowered, unarmed, much shorter than leaf ; corolla pale yellow ; pods oblong, .05 long, .01 broad, upper margin 2-winged ; seeds 5-7,

globular, smooth — Spring — Hedges and fields; common along coast and in lower districts of interior.

2. L. Aphaca, L. ⊙ *Showarib-el-Busein. Hamâm-el-Bourg.* .3 to .6, glaucescent ; stems flaccid, prostrate or ascending, angled. Stipules often .02 long, .014 broad, *ovate, truncate at base, 2-auricled.* Peduncles 1-flowered, longer than tendril; corolla yellow; pod linear, .03 long, .005 broad, somewhat falcate, netted-veined ; seeds uniformly brown — Spring — Fields ; common throughout.

FIG. 151.



Pod of L. Aphaca.

Var. **marmoratus,** Post. Seeds marbled with black — Beirût. (*L. polyanthus, Boiss. et Bl.*)

Var. **biflorus,** Post. Peduncles mostly 2-flowered — Marash ; Kessab ; Sarada.

3. L. stenolobus, Boiss. ⊙ Glabrous or appressed hirtulous ; stems diffuse, angled. stipules *oblong-lanceolate, acute, with long, acute, auricles.* Peduncles 1-flowered, long ; corolla yellow ; pods .02 long, .003 broad ; seeds .002 long, oblong — June — Woods; Cassius.

4. L. Nissolia, L ⊙ .2 to .4, stems rigid, erect, simple. Peduncles filiform, 1-2-flowered, shorter than petiole ; corolla reddish, .01 long ; pod linear, .05 long, .003 broad, with longitudinal nerves ; seeds 12-18, ovate, warty — Spring — Fields ; Lebanon and Antilebanon.

5. L. annuus, L. ⊙ .3 to .6; stems ascending or climbing, winged, especially toward apex. Stipules semi-sagittate, *narrowly linear-lanceolate, shorter than petiole.* Leaflets linear-lanceolate, often .1 long, and .014 broad. Peduncles 1-2-flowered, shorter than leaf ; corolla *yellow,* .012 *long;* pod linear, netted-veined, with straight upper border, and *six,* coarse-tubercled seeds — Spring — Fields ; common.

Var. **Hierosolymitanus,** Post. Peduncles 2-3-flowered. Standard *yellowish-pink.* Pods .06 to .07 long, .005 broad, 6-10-seeded — Common. (*L. Hierosolymitanus, Boiss.*)

Var. **Cassius,** Post. Leaves narrower. Flowers pinkish. Pods 6-7-seeded — Less common than last. (*L. Cassius, Boiss.*)

6. L. Cicera, L. ⊙ .2 to .5; stems ascending or climbing, narrowly winged. Stipules semi-sagittate, *oblong-lanceolate,* usually a little longer than petiole ; leaflets linear-lanceolate to linear. Peduncles 1-flowered, shorter than leaves ; corolla *red,* .015 long ; pod oblong, .025 long, .006 to .01 broad, upper border nearly 2-winged ; seeds 4-5, glabrous — Spring — Fields ; common.

Var. **lineatus,** Post. Leaflets linear-lanceolate, .002 to .003 broad. Pods .02 to .03 long, .01 broad, *oblong-rhombic, valves marked with a prominent midrib* — Khan Hatrurah ; Ḥaurân ; Aintâb.

7. L. amœnus, Fenzl. ⊙ .2 to .6, stems diffuse or climbing, winged. Stipules semi-sagittate, *oblong-lanceolate,* usually a little

longer than petiole. Peduncles 1-flowered, about as long as leaf; corolla *reddish-yellow;* calyx-lobes twice as long as tube, .02 to .025 long; pod .025 to .04 long, .008 to .01 broad, upper margin straightish, *flattened*, 3-*keeled;* seeds 5-8, glabrous — Spring — Fields; common.

Var. **stenophyllus,** Post. .01 to .03, *rigid.* Leaflets linear, .001 to .002 broad. Flowers .01 to .015 long. A well pronounced variety with the broad stipules, characteristic flowers, and 3-keeled pods of L. amœnus, but with the linear leaves of L. stenophyllus, Boiss. et Held. — Antilebanon; Ḥaurân; Damascus; Beirût.

8. L. stenophyllus, Boiss. et Held. ⊙ .2 to .4; stems filiform, angled, narrow-winged, procumbent. Stipules semi-sagittate, *linear-lanceolate*, about as long as petiole; leaflets *linear*, .001 to .003 broad. Peduncles 1-flowered, as long as or longer than leaves; calyx-lobes as long as tube; corolla *violet-purple, the standard darker;* pod .04 long, .008 broad; seeds 5-6, glabrous, yellowish — Spring — Grassy hillsides; sea coast; Lebanon.

9. L. marmoratus, Boiss. et Bl. ⊙ .3 to .6, stems slender, diffuse, narrow-winged. Stipules semi-sagittate, *oblong to lanceolate*, as long as petiole; leaflets lanceolate-linear, mucronate. Peduncles 1-flowered, shorter than leaf; calyx-lobes twice as long as tube; corolla *pale violet-pink;* pod linear sub-rhombic, .02 long, .006 broad, upper margin with two *narrow wings;* seeds 3-4, globular, *rusty- and black-marbled* — Spring — Sandy fields; coast; Lebanon; Beersheba.

10. L. sativus, L. *Jilbân.* ⊙ .3 to .6, stems procumbent or climbing. Stipules semi-sagittate, *oblong-lanceolate*, shorter than petiole; leaflets oblong-lanceolate. Peduncles 1-flowered, a little shorter than leaf; calyx-lobes lanceolate, twice as long as tube; corolla *bluish-pink or whitish;* pod oblong, .04 long, .01 broad, upper margin with *two broad wings;* seeds about 4, *angled, smooth, yellowish* — Spring — Thickets and banks; Moab.

Var. **stenophyllus,** Boiss. Leaflets linear — Aleppo.

11. L. erectus, L. ⊙ .3, stems *angled, erect.* Stipules semi-sagittate, *linear-lanceolate;* petioles *very short, ending in a short, straight mucro;* leaflets linear-lanceolate. Peduncle 1-flowered, as long as or shorter than petiole; calyx-teeth lanceolate-subulate, as long as tube; pod linear, .05 long, .003 broad, somewhat falcate, upper border *3-ribbed, not winged;* seeds 8-12, spherical, somewhat truncate, smooth — Spring — Fields, Jerusalem; Beirût; Aleppo to Aintâb, and northward.

Var. **stenophyllus,** Boiss. Leaflets .001 to .002 broad — Aintâb.

12. L. blepharicarpus, Boiss. *El-Julaibîneh.* ⊙ .2 to .5, stems diffuse, angled, somewhat winged. Stipules semi-sagittate, oblong-lanceolate, acute, about as long as petiole; leaflets oblong-lenticular, .01 to .03 long, the upper linear-lanceolate, *rather obtuse.* Peduncles 1-flowered, rather longer than leaf; calyx-lobes lanceolate, twice as long as tube; corolla purple with whitish keel; pod oblong, .02 to .03 long, .01 broad, *ciliate-margined*, upper border with 2 broad wings; seeds 3-4, globular, *black*, punctate — Spring — Fields; common. The seeds are much liked by the people of the country.

13. L. chrysanthus, Boiss. ⊙ ② .3 to .5, sparingly hispid; stem narrow-winged, much branched. Stipules semi-sagittate, small, linear-lanceolate; leaflets oblong-lanceolate, .03 to .06 long, .01 broad, mucronate, 5-7-nerved, wavy-margined. Peduncles 2-4-flowered, *non-aristate;* calyx-teeth triangular-lanceolate, about as long as tube; corolla *golden-yellow*, .012 long; pod .035 long, .01 broad, 6-10 seeded — Spring — Cœlesyria and northward.

14. L. chloranthus, Boiss. ② .5 to .7, sparingly hispid, with creeping root-stock; stems decumbent, narrow-winged. Stipules small, linear-lanceolate, the lower semi-sagittate; leaflets oblong-elliptical, .04 to .06 long, .015 to .018 broad, obtuse, 3-nerved. Peduncle 1-2-flowered, *long-aristate;* calyx-teeth triangular-lanceolate, *aristate*, longer than tube; corolla *greenish-yellow*, .02 long; pod .03 to .04 long, .005 broad — Summer — Thickets; Marash, and northward.

15, L. tuberosus, L. ♃ .3 to .6, glabrous-glaucescent; root-stock creeping, *bearing large tubers;* stem angled, prostrate or ascending. Stipules semi-sagittate, *narrow*, lanceolate; leaflets *elliptical*, .02 long, .01 to .013 broad, mucronate. Peduncle 3-8-flowered, longer than leaf; upper calyx-teeth short, lower as long as tube; corolla *purple;* pods linear-oblong, .03 long, .006 broad, inflated; seeds obsoletely tubercled — Summer — Hedges; Marash, and northward.

16. L. pratensis, L. ♃ .3 to .4, glabrous or appressed-hairy; root-stock creeping; stems somewhat climbing. Stipules *broad*, lanceolate-oblong *with two unequal appendages at base;* leaflets *ovate to ovate-lanceolate, lanceolate*, and *linear*. Peduncles 4-10-flowered; calyx-teeth lanceolate-subulate, as long as tube; corolla *yellow;* pod black, linear, .025 to .03 long, .005 broad, somewhat curved at tip; seeds globular, smooth— Summer —Subalpine Lebanon, Amanus, and northward.

Var. **augustifolius,** Post. Glabrous. Leaflets and stipules oblong to oblong-lanceolate. Petioles sometimes cirrhous — Beilân.

47. OROBUS, L. Orobus.

Separable from Lathyrus only by habit; the petiole ending in a simple awn, instead of a tendril, and the stems always erect or ascend--ing, not climbing.

1. O. sessilifolius, S et S. ♃ .2 to .4, glabrous; *stems leafless below*. Leaflets 1-2 pairs, *linear-lanceolate*, acute; petiole short or 0, much shorter than short, semi-sagittate, lanceolate-linear stipules. Peduncles long, 5-10-flowered; calyx-teeth nearly equal, lanceolate; corolla purple; pod linear, somewhat incurved at tip — Spring — Woods and thickets of middle mountain zone throughout.

2. O. variabilis, Boiss. et Ky. ♃ .5, glabrous; stems ascending, angled. Petiole short; leaflets 1-2 pairs, *obovate-oblong to oblong-lanceolate*, 9-11-nerved, .02 to .04 long, .008 to .012 broad, the upper acute; stipules semi-sagittate, acute. Peduncles 5-9-flowered; calyx-lobes *triangular-lanceolate*, the upper shorter, curved upward; corolla blue; pod linear — May and June — Subalpine Lebanon near Bsherri; Akherdagh, and northward.

3. O. hirsutus, L. ♃ .2 to .5, hirsute or glabrous. Stems angled, branching, *leafy from base.* Leaflets 1 pair, *elliptical,* .02 long, .01 to .014 broad, acute or acuminate ; *stipules nearly as large as leaflets, resembling them in shape, but with lanceolate appendix at base.* Peduncles 2-5 flowered, longer than leaves; raceme one-sided ; calyx-teeth lanceolate, acuminate, twice as long as tube ; corolla violet ; pod .04 long, .004 broad, black, somewhat curved upward — May and June — Woods ; mountains of Lebanon, Cassius and Amanus, and northward.

4. O. grandiflorus, Boiss. ♃ .5 to .8, glabrous. Leaves of 3-4 pairs, *the upper sometimes odd-pinnate,* of ovate to ovate-oblong, .05 to .07 long, .025 to .03 broad leaflets ; stipules *oblong-sagittate, acuminate,* denticulate at base. Peduncles many-flowered, scarcely longer than leaf ; calyx-teeth unequal, *the upper pair very short, mucronate;* corolla *whitish-yellow,* .02 to .03 long —Summer — Woods ; Lebanon above Ehedin ; Amanus above Beilân.

48. PISUM, L. Pea. *Bĭshleh. Bizella.*

Same as Lathyrus in habit, and other particulars, except the style which is inflexed, flattened from above downward, the margins bent downward, and united at tip in a laterally flattened stigma, bearded along its upper surface — Annual or perennial herbs with abruptly pinnate leaves, and cirrhose or aristate petioles.

* *Glabrous, glaucescent, cirrhose annuals with semi-cordate stipules as large as leaflets or larger, dentate at base or all around. Keel crested.*

† *Leaflets* 2-3 *pairs.*

1. P. sativum, L. ⊙ 1 to 2. Stipules *as long as* 1-2-flowered peduncles ; leaflets entire, .03 to .04 long, .02 to .03 broad. Flowers *white.* Seeds globular, smooth, .006 to .008 in diameter — Spring — Escaped from cultivation.

2. P. arvense, L. ⊙ 1. Stipules shorter than 1-2-flowered peduncles ; leaflets entire or somewhat dentate, .02 to .04 long, .01 to .03 broad. *Flowers bluish, with deep purple wings ;* seeds *angled,* smooth — Spring — Hedges ; common in lower plains and hill districts.

3. P. elatius, M.B. ⊙ 1 to 3, *climbing. Stipules often twice as large as leaflets,* often .07 long, .04 broad, shorter than 1-3-flowered peduncles ; leaflets entire or dentate, .02 to .03 long, .01 to .02 broad. Flowers *violet-purple, with deep purple wings ;* seeds granular, grey, *mottled with brown* — Spring — Hedges ; common.

4. P. humile, Boiss. et Noe. ⊙ .5, *ascending.* Stipules about as long as 1-2-flowered peduncles, a little longer than leaflets ; leaflets oblong, .02 to .03 long, .006 to .01 broad, *unusually more or less dentate or incised above middle. Flowers livid, with dirty purple wings ;* seeds granular, globular, brown mottled with green, .004 in diameter — Spring — Fields and stony places ; common.

5. P. fulvum, S et S. ⊙ .5, stems slender. Stipules .01 to .02 long, shorter than 1-2-flowered peduncle ; leaflets *ovate to orbicular,* .01 to .02 long, *dentate.* Flowers .01 long, *rusty-yellow ;* pod .04 long,

.01 broad ; seeds globular, velvety-black, .004 in diameter — Spring — Rocky places ; common.

* * *Alpine perennials, with small stipules ; keel crestless ; tendrils* 0.

6. P. formosum, Stev. ♃ .08 to .1, root-stock elongated, slender; stems subterranean ; branches simple, procumbent. Stipules semi-ovate, *sagittate*, much shorter than petiole ; leaflets 1 pair, *obovate-rhombic*, .006 to .01 long, *entire*, mucronate. Peduncles 1-flowered, twice as long as leaves ; corolla incurved, .015 long, *pink ;* pod .02 to .03 long, .004 broad ; seeds ovate, smooth — Summer — Alpine Lebanon, above Cedars.

49. VIGNA, Savi. Bean. *Lubiyah.*

Upper calyx-teeth connate or free. Standard orbicular, with inflexed auricles at base. Wings falcate, somewhat shorter than standard. Keel incurved, beakless, or with a short, incurved beak. Ovary ∞-ovuled ; style bearded lengthwise on upper surface. Pod linear-subterete, partitioned between seeds — Twining herbs, with trefoil, stipellate leaves, and flowers clustered at tip of long, nodose peduncles.

V. Nilotica, L. ♃ ⊙ *'Ulleiq.* Pubescent. Leaflets *ovate*, acuminate. Corolla greenish-yellow ; pod appressed-hirsute, .05 long, .003 broad, pendulous ; seeds brown, with a black spot — May to September — Hedges by ditches and swampy places, near coast.

The cultivated state of this species, with hirsute stems, cylindrical, .07 long, .003 broad pods, and greenish-brown seeds, is called *Mâsh* by the Arabs. The seeds are cooked and eaten in the same way as lentils.

Vigna Sinensis, L. var. sesquipedalis, L. *Lubiyah beledîyah*, the String Bean of the country, is cultivated everywhere.

50. DOLICHOS, L. Lablab. *Lablâb.*

Calyx and corolla as in Vigna, except that the keel is usually beaked. Style in ours thickened above, bearded lengthwise. Pod flattened, falcate or linear, with thickened sutures, and not partitioned between seeds — Twining herbs, with trefoil, stipellate leaflets, and long-stalked racemes of flowers on glandular knobs.

D. Lablab, L. *Liblâb. Lubiyah 'afinah. Sheranjîb.* ♃ Glabrous. Leaflets *rhombic-ovate*, acuminate. Corolla pink, .02 long ; pod .1 long, .02 to .03 broad; seeds .01 long, .007 broad, elliptical, blackish, with a long white hilus — Spring and Summer — Common in cultivation, and run wild near houses.

Phaseolus vulgaris, L., the Kidney-Bean, Haricot, or String Bean, *Lubiyat-ifranjîyah*, is cultivated along the coast.

A species, called by the natives *Lubiyat-Qusâs*, has pods mottled with scarlet, and light fawn-colored seeds mottled with scarlet. Perhaps it is a variety of P. multiflorus.

51. RHYNCHOSIA, Lour. Rhynchosia.

Calyx and corolla as in Vigna. Ovary 1-2-ovuled; style incurved; stigma small, terminal; pod flattened, not partitioned — Twining herbs

or shrubs, prostrate or erect, with trifoliolate, stipellate leaves on an axis destitute of nodes, sometimes solitary in the axils.

1. R. minima, D.C. ♄ Minutely puberulent ; stems *very slender*. Leaflets rhombic-obovate, .007 to .01 long. Racemes few-flowered, longer than leaves ; pod oblong, .015 long, .005 broad ; seeds elliptical, rusty-yellow, mottled with black — Spring — Ghor-es-Safieh, climbing on Acacias.

2. R. Schimperi, Hochst. ♄ Appressed-pannous, white, stems *shrubby, erect*, somewhat twining. Lateral leaflets ovate, terminal cuneate-obovate, often retuse. Flowers axillary, solitary twin, short-pedicelled; pod woolly, *obovate-oblong*, tapering at base, obliquely acute at apex; seeds globular, flattened, black — Spring — Midian (Tistram).

52. CASSIA, L. Senna. *Senâ.*

Calyx-tube very short; sepals and petals imbricated. Stamens 5 or 10, free, equal, or the upper smaller; anthers fixed at base, generally opening by a pore or chink at apex. Pod various, indehiscent, generally 2-valved — Herbs, shrubs, or trees with abruptly pinnate leaves.

1. C. obovata, Collad ♃ *Senâ-Mekki.* Appressed hirtulous, glaucescent ; stems herbaceous, ascending. Leaflets 4-7-pairs, *obovate-truncate* to oblong ; pod *oblong-falciform*, .07 long on upper border, .015 broad, *with a semi-lunar line of elevated crenæ along middle of valve, very obtuse at base and apex*, separated by transverse partitions — Winter and Spring — Wadis around Dead Sea and 'Arabah to Sinai.

2. C. lanceolata, Forsk. ♃ *Senâ-sa'îdi, Lisân-el-'Asfûr.* Sparingly appressed-hirtulous; stems ascending, sub-herbaceous. Leaflets 3-7-pairs, *oblong-lanceolate to lanceolate, acute.* Pod *elliptical-oblong*, scarcely curved, obtusely winged on both sides — Spring — Sinai.

53. CERATONIA, L. Carob. *Kharrûb.*

Flowers polygamous or dioecious. Calyx-tube short, top-shaped, with 5, dentiform, deciduous segments. Petals 0. Stamens 5, free, anthers elongated, versatile. Pod elongated, leathery, indehiscent, divided between the seeds by pulpy partitions containing a peculiar saccharine substance.

C. Siliqua, L. ♄ St. John's Bread. Carob. *Kharrûb.* A fine evergreen tree, with hemispherical top, often reaching 10 metres in height and ten in diameter of branches, thornless. Leaflets oblong, obtuse, or obovate, frequently retuse, coriaceous, glistening above. Racemes short, solitary or clustered along the year old branches ; pod .15 to .3 long, .02 to .03 broad, .005 thick, brownish-black — Oct. to Dec. — Very common. Dibs is made of the pulp of the pods. The fruit is the "husks" of Luke xv. 16.

54. CERCIS. L. Red-Bud. Judas Tree. *Zemzarîq.*

Calyx campanulate, somewhat oblique with 5, broad, short teeth. Petals 5, pseudo-papilionaceous, the standard being within the wings. Stamens declined, free. Ovary stipitate, free at bottom of calyx. Pod flattened—Shrubs or trees with entire leaves, and pink flowers, in small racemes along the old branches.

C. Siliquastrum, L. ♄ *Zemzarîq.* A straggling tree, with oblong top 6 to 10 metres high. Leaves cordate-orbicular, .1 broad. Standard shorter than wings and keel; pod .13 to .15 long, .016 broad, narrow-winged at upper suture — April — Rocky places; common. Very showy in flower and fruit.

55. PROSOPIS, L. Prosopis. *Junbûṭ.*

Flowers generally sessile. Pod thick, or sub-terete, straight, or variously twisted, coriaceous or corky, partitioned between the seeds — Thornless or prickly trees or shrubs, with bipinnate leaves, and cylindrical spikes.

1. P. Stephaniana, Willd. *Kharembah, Junbûṭ. Shilsh-ḥilâwi. 'Aqûl. 'Uqeil.* An unsightly, straggling shrub, .3 to 1 high, with scattered, conical, .003 long prickles, and pubescent twigs and petioles. Pinnæ of 3-5 pairs; leaflets 8-12 pairs, linear-oblong, .002 to .004 long. Spikes longer than leaves; pod ovoid-oblong, .03 long, .015 broad, incurved or more or less constricted and deformed, brownish-black — Summer — Waste fields; common, especially in interior plains.

2. P. spicigera, L. ♄ 2 to 3, glabrous, prickles scattered, conical, sometimes 0. Pinnæ of 2-3 pairs. Leaflets 6-12 pairs, oblong, .006 long, .002 broad. Spikes elongated, often interrupted at base, solitary or twin; pod .1 long, .007 broad, *nearly terete*, torulose, often curved — Spring — Jordan valley (Tristram).

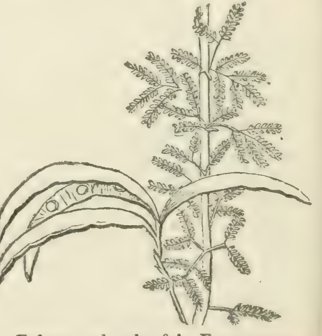
56. ACACIA, Willd. Acacia. *Sanṭ.*

Calyx campanulate or 5-sepaled. Petals generally more or less united. Stamens exserted. Pod terete, flattened, or twisted—Shrubs or trees with bipinnate leaves.

* *Flowers globular-capitate. Leaflets* .002 *to* .004 *long*, .001 *broad, obtuse.*

1. A. Farnesiana, Willd. ♄ *'Anbar. Qarz.* 3 to 5. Spines .01 to .02 long; twigs and petioles puberulent. Pinnæ 5-8 pairs; leaflets 15-20 pairs, oblong. Heads solitary or clustered in axils, peduncles unequal; flowers golden-yellow, with oppressively sweet odor; pods cylindrical, .06 to .08 long, .015 thick, brown, somewhat tapering at ends, slightly curved — Winter — Hedges and water-courses, introduced, but subspontaneous. Flowers much prized by the natives.

Fig. 152.



Foliage and pods of A. Farnesiana.

2. A. Nilotica, Del. ♄ 5 to 6. Stipular-spines long, straight, *those of the flowering branches abortive or* 0. Pinnæ 4-8 pairs; leaflets 15 to 27 pairs. Peduncles bracteate above middle; pod .1 long, .012 broad, *flattened, necklace-shaped, with rhombic-orbicular joints* — Winter — Southern Sinai to Egypt.

3. A. tortilis, Hayne. *Seyyâl.* ♄ 5 to 8. Stipular-spines alternately long, straight, and short, recurved. Pinnæ 2-6 pairs; leaflets

oblong, 5-12 pairs; petiole with a *glandule under each pair*. Peduncles bracted at middle; pod .1 long, .008 to .01 broad, *torulose-moniliform, more or less spirally-curved*, longitudinally nerved — Winter — Valleys about Dead Sea, and southward.

Fig. 153.



Pod of A. tortils.

4. A. Seyal, Del. *Seyâl.* ♄ 4 to 5. Spines .03 long, straight, horizontal, rarely abortive. Pinnæ 3-5 pairs; leaflets 8-12 pairs; petiole 1-3-*glandular*. Peduncles bracted below middle; pods .1 or more long, .008 broad, torulose, tapering at each end — Valleys about Dead Sea, and southward. Too near the last.

* * *Flowers spiked. Leaflets obliquely oblong, .008 long, .002 broad.*

5. A. albida, Del. ♄ 2 to 5. Branches *white*, glabrous; spines straight, stout, .01 long, sometimes abortive. Pinnæ 4 to 5 pairs; leaflets 7-12 pairs. Spikes twice as long as leaves; *pod thick, coriaceous*, pulpy, more or less spirally twisted — September to February — Gorge south of Jubail; near Sidon and Gaza, and southward to Egypt.

6. A. læta, R. Br. ♄ 3 to 5. Glabrous, glaucescent; prickles twin, short, somewhat recurved or 0. Pinnæ 2-3 pairs; leaflets 3-5 pairs. Spikes generally twin, axillary, *as long as leaves;* pod oblong, .06 to .08 long, .025 broad, often sinuate, tapering at base, acute or obtuse at apex, *membranous* — Winter — Sparingly in the Ghor-es-Safieh.

ORDER XXXVI. **ROSACEÆ.** (ROSE FAMILY.)

Herbs, shrubs, or trees with regular, generally hermaphrodite flowers, the numerous (or few) free stamens inserted with the petals on the calyx, and the 1-∞, *1-celled carpels, distinct or connate, and more or less adnate to calyx-tube. Seeds ex-albuminous,* 1-2 *in each ovary. Leaves alternate, stipulate* — Calyx 5-toothed or cleft. Petals as many as calyx-teeth, inserted on the edge of the disk which lines the calyx-tube.

TRIBE I. **AMYGDALEÆ.** Calyx free, caducous. Ovary superior. Fruit a drupe — Trees or shrubs.

1. AMYGDALUS. *Fruit a green drupe, the fleshy part at length becoming dry.*

2. CERASUS. *Fruit a smooth, spherical or ovate, fleshy drupe, without bloom.*

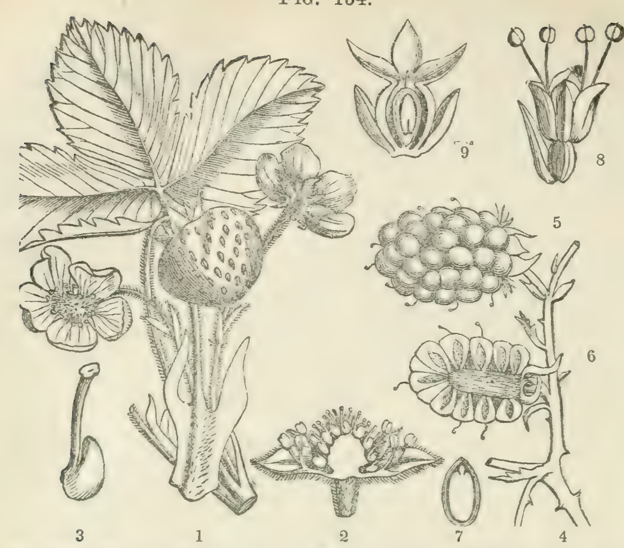
3. PRUNUS. *Fruit an oblong or spherical, fleshy drupe, with a bloom.*

TRIBE II. **RUBEÆ.** Calyx free, spreading. Stamens numerous. Carpels numerous, inserted on a convex or conical receptacle, at length drupe-like, 1-seeded, connate, forming a spurious berry.

4. RUBUS. A prickly shrub, with ternate, quinate or pinnate leaves; flowers white or pink.

TRIBE III. **DRYADEÆ.** Calyx persistent Stamens generally numerous. Carpels usually numerous, 1-seeded, free; receptacle convex or conical, dry or fleshy.

FIG. 154.



(1) Plant of the Strawberry, with leaf, flower and fruit. (2) Half a flower, after the petals have fallen, showing the stamens implanted in the calyx, and the swollen torus on the surface of which are the akenes. (3) One of the akenes, with lateral style attached at base. (4) A fruiting twig of Rubus. (5) A fruit. (6) The same split lengthwise, showing the long, central torus, and the drupe-like fruits. (7) A longitudinal section of one of the drupelets. (8) Flowers of Sanguisorba. (9) Fruit of the same.

5. GEUM Style persistent, (in ours) hirsute. Receptacle dry. Leaves incised-pinnate.

6. FRAGARIA. Style caducous. Receptacle fleshy in fruit. Leaves trefoil.

7. POTENTILLA. Style caducous. Receptacle dry in fruit. Leaves digitate, trefoil, or pinnate.

TRIBE IV. **POTERIEÆ.** Calyx-tube urn-shaped with throat almost closed, containing the free ovaries. Stamens various. Carpels 1-3, 1-ovuled. Akenes dry.

8. ALCHEMILLA. Petals 0. Stamens 1-4. Calyx 8-parted.

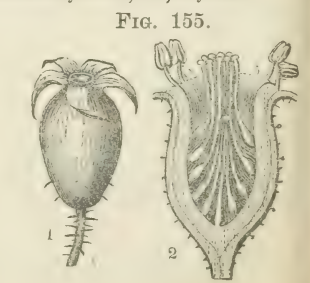
9. AGRIMONIA. Petals 5. Stamens 15. Calyx 5-fid.

10. POTERIUM. Flowers polygamous. Stamens 20 to 30. Calyx 4-fid.

TRIBE V. **ROSEÆ.** Calyx urn-shaped. Stamens ∞. Carpels ∞, 1-ovuled, nut-like, indehiscent, free, but enclosed in the fleshy, at length succulent calyx.

11. ROSA. Prickly shrubs, leaves pinnate, and flowers showy white, red, or yellow.

FIG. 155.



(1). Fruit (hip) of a Rose, showing the persistent calyx-lobes at apex. (2). The same, divided lenghwise, to show the akenes. implanted on its inner surface, and ending in long styles; also the stamens implanted at the throat of the calyx. See also (1) Fig. 156.

TRIBE VI. **NEURADEÆ.** Calyx persistent, its tube growing after flowering, and adherent to carpels.

12. NEURADA. Stamens 10. Carpels 5 to 10, verticillate; fruit orbicular. Prostrate herb

TRIBE VII. **POMEÆ.** Trees or shrubs. Calyx-tube adherent to ovary. Stamens numerous, inserted with petals at throat af calyx. Ovary 2-5-celled, cells 2-∞-ovuled. Fruit fleshy.

13. PYRUS. Carpels 5. Endocarp, cartilaginous; mesocarp studded with stony grains. Anthers pinkish-violet. Fruit a Pear.

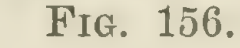
14. MALUS. Carpels 5. Endocarp cartilaginous; mesocarp not granular. Anthers yellow. Fruit an Apple.

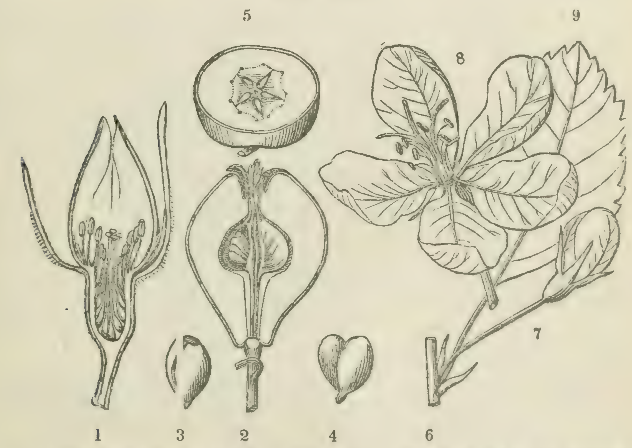
15. SORBUS. Carpels 2-4. Endocarp crustaceous; mesocarp fleshy. Trees with serrate or lobed leaves. Fruit somewhat resembling a crab-apple, more like a rose-hip.

16. MESPILUS. Carpels 5. Fruit drupe-like, containing 5, bony, 1-seeded pyrenes. Small trees with entire leaves.

17. CRATÆGUS. Carpels 1-5. Fruit drupe-like, containing 1-2, rarely 5, bony, 1-seeded pyrenes. Small trees with lobed leaves.

18. COTONEASTER. Carpels 1-5. Fruit drupe-like, containing 2-5, bony, 1-seeded pyrenes. the base adherent to calyx, but the apex free. Shrubs with entire leaves.


FIG. 156.



(1) Longitudinal section of Rose, showing the akenes attached to the hollow-calyx, the stamens implanted at throat of calyx, along with the petals, and enclosed in the calyx-lobes. (2) Longitudinal section of a Quince, showing the fleshy calyx, enclosing the adherent ovary with its seeds, implanted on a central placenta. (3) One of the seeds. (4) Its embryo. (5) Cross section of an Apple, showing the fleshy calyx adherent to the fleshy ovary which is defined by the crenate lines near the middle, and encloses the seeds. (6) Branch of a Pear in flower. (7) A flower-bud of the same. (8) An open flower. (9) A leaf.

1. AMYGDALUS, L. ALMOND. *Lauz.*

Drupe nearly 2-valved at maturity. Putamen smooth or wrinkled, often pitted — Shrubs or trees, with conduplicate æstivation, nearly sessile flowers, and peduncles thickened in fruit.

* *Unarmed shrubs, with erect, spartioid branches. Stamens* 20-30.

1. A. spartioides, Spach. ♄ 1 to 1.5, branches *angled.* Leaves *linear-lanceolate,* acute, crenulate, tapering to a petiole. Petals oblong-spathulate; drupe rather glabrescent, ovate-oblong, .015 long;

almond not pitted — Spring — Rocky slopes ; Antilebanon, Damascus, Marash, and north-eastward.

Var. **agrestis,** Post. Branches *terete* — Cœlesyria. (*A. agrestis, Boiss.*)

* * *Unarmed or spinescent shrubs or tree, with tortuous branches. Stamens about* 30.

2. A. communis, L. ♄ 5 to 8, *unarmed.* Leaves oblong to oblong-lanceolate, glandular-crenate, acutish or obtuse, petioled. Drupe ovate, somewhat flattened, .03 to .04 long, .02 to .025 broad, *pannous ;* almond pitted, keeled — Spring — Common, both wild and in cultivation.

Var. **microphylla,** Post. Spinescent. Leaves .01 to .02 long — Near 'Uyun Mûsa, Moab.

Var. **pedunculata,** Post. Peduncles almost as long as calyx-tube — Marash ; Antilebanon.

3. A. Orientalis, Ait. ♄ 1 to 2; branches dense, at length spinescent. Leaves obovate, elliptical, or lenticular, obtuse, entire, more or less petioled, *canescent on both sides.* Drupes ovate to oblong, .015 long, .01 broad, .008 thick, acute, appressed-canescent, then glabrous; almond *obsoletely netted-veined*, keeled, not pitted — Spring —Dry, rocky places ; Antilebanon to Aintâb, Marash, and northward.

* * * *Spiny, divaricately much branched shrubs. Stamens* 9-17.

4. A. lycioides, Spach. ♄ Glabrous ; branches intricate, with greyish bark. Leaves *linear-lanceolate*, acute, denticulate, sessile, .015 to .02 long, .002 to .003 broad. Calyx-tube *cylindrical*, .005 long, thrice as long as oblong, obtuse teeth ; 5-10 stamens inserted in throat, and the remainder lower down ; drupe ovate-oblong, velvety-canescent, mucronulate, .012 long ; almond *netted-grooved*, *not pitted*, keeled — Spring — Aintâb to Marash, and north-eastward.

Persica vulgaris, L., the Peach (*Derrâqn*), and Armeniaca communis, L., the Apricot (*Mishmush*), are extensively cultivated, and of the latter there are several fine varieties, as the *Lauzi*, the *Kuleibi*, and the *Farisi*. The Nectarine is also cultivated.

2. CERASUS, L. Cherry. *Karaz.*

Drupe globular, fleshy, indehiscent, glabrous, destitute of bloom. Stone nearly globular, wrinkled or smooth — Trees or shrubs with conduplicate æstivation.

* *Flowers solitary or twin, or* 2-4, *white or pink, coming out with leaves ; calyx-tube cylindrical.*

1. C. microcarpa, C. A. Mey. ♄ 2 to 3. Branches *long*, *erect.* Leaves ovate to oblong, .01 to .02 long, .005 to .01 broad, acutely serrulate, petiole somewhat shorter than lamina. Peduncles often longer than flower ; calyx-tube .004 long, .0015 broad ; petals as long as calyx-tube, drupe smaller than a pea; stone smoothish — Spring — Cœlesyria, Antilebanon, and north-eastward.

2. C. tortuosa, Boiss. et Haussk. ♄ 1. Branches *tortuous*, Leaves pubescent when young, oblong-elliptical, obtuse, or acute,

acutely serrulate, .01 to .03 long, .005 to .015 broad, those of sterile branches often much larger. Peduncles as long as calyx; calyx-tube * *; petals a little longer than calyx; drupe small, ovate; stone smoothish — Spring — Mountains of Syrian Desert to Aintâb, and northward.

3. C. prostrata, Labill. ♄ A low, often prostrate or procumbent shrub, with stiff, intricate, divaricate branches. Leaves ovate to orbicular, acutely serratulate, short petioled, *canescent beneath*, .005 to .01 long. Calyx-tube .003 long, .0015 broad; drupe ovate-globular, as large as a pea, somewhat grooved — Summer — Mountains of Galilee; alpine Lebanon, Antilebanon, Amanus, Akherdagh, and northward.

Var. **concolor,** Boiss. Leaves glabrous on both sides — El-Jebel-el-Abiaḍ in the Syrian Desert.

* * *Flowers corymbed, white, coming out with leaves.*

4. C. Mahaleb, L. *Mahleb.* ♄ 2 to 3; branches numerous, spreading. Leaves ovate to round-ovate, acuminate, often cordate, .03 to .05 long, obtusely serrate. Drupe ovate, as large as a pea, generally mucronate — Spring — Duma, (Lebanon); Marash, and northward.

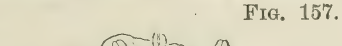


FIG. 157.



(1) Flower of Cerasus, cut open lengthwise showing the calyx free from the ovary, but enclosing it in its tube, the stamens and petals inserted at throat of calyx-tube, and the calyx-lobes reflexed. The ovary is seen to be surmounted by terminal style. (2) Drupe of the same species of Cerasus.

3. PRUNUS, Tourn. PLUM. *Khaukh.*

Drupe fleshy, indehiscent, covered with a bloom. Stone ovate, flattened, wrinkled or smooth — Trees or shrubs, with convolute æstivation.

1. P. spinosa, L. ♄ A low shrub with divaricating, spiny branches, the twigs glabrous or puberulent. Leaves lanceolate or elliptical, serrate, glabrescent. 1-2-flowered; peduncles glabrous or puberulent; drupe erect, globular, .01 in diameter — April — Amanus, and northward.

2. P. monticola, C. Koch. ♄ Petioles sometimes puberulent, otherwise glabrous, unarmed or spinescent. Leaves elliptical, short-acuminate serrulate, cuneate at base. Buds 2-flowered; peduncles slender, as long as fruit; drupe .015 long, ovate, obliquely mucronate — Spring — Woods; Antilebanon, Cassius, Amanus, and northward.

3. P. ursina, Ky. *Khaukh-ed-Dib. Braqrûq.* 4 to 8, straggling. Branches erect, tortuous, somewhat spinescent; twigs velvety. Leaves orbicular, ovate, and elliptical to oblong, .02 to .03 long, .015 to .03 broad, crenate, rounded or acute at base, velvety below. Buds usually 2-flowered, but generally maturing only one fruit; peduncles short,

velvety; drupe globular, violet-red to yellow, .02 in diameter — Spring — Middle and subalpine mountain regions of Lebanon and Antilebanon to Amanus, Akherdagh, and northward.

4. P. Cerasia, Bl. ♄ 3 to 5; branches straight, unarmed, glabrous. Leaves obovate-elliptical, often .05 to .07 long, .02 to .03 broad, tapering to a short petiole, crenate-dentate, glabrous, except along veins. Buds 1-2-flowered; fruit ovate, .015 to .02 long, .013 broad, bluish-black — Spring — Extensively cultivated; from an unknown source. Resembles the Damsom in flavor and appearance, but has a longer, acutish stone.

5. P. domestica, L. ♄ Plum. *Khaukh.* 5 to 8, unarmed; twigs glabrous. Leaves obovate-elliptical, tapering to a petiole, serrate, hirsute on lower surface, especially along the nerves. Peduncles pubescent; drupe oblong, .02 or more long, nodding— Spring— Cassius, and northward. Many fine varieties of this species are cultivated in Syria.

4. RUBUS, Bramble. Blackberry. *'Ulleiq. Kubûsh.*

Calyx bractless, lobes 5, persistent. Stamens 5. Style nearly terminal, stigma simple or capitellate. Drupes 1-seeded, with fleshy pericarp, and wrinkled stone, more or less united into a deciduous, cylindrical or spherical berry — Prickly shrubs, spreading by suckers, rarely herbs, leaves alternate, ternate, quinate, or pinnate, stipuled, the black berry (in ours) adherent to the receptacle.

* *Stems terete, or obscurely angled.*

1. R. cæsius, L. ♄ Stems *prostrate*, glabrous below, puberulent above; prickles slender, straight or recurved. Leaves ternate, very rarely quinate, green above, ovate, the lateral sessile. Racemes corymbed; sepals lanceolate, mucronate; petals white; fruit black, juicy — Nusairy Mountais to Amanus, and northward.

* * *Stems angled and often grooved.*

2. R. tomentosus, Borckh. ♄ Prickles *weak, somewhat incurved.* Leaves quinate and ternate, green to canescent above, canescent below; leaflets oblong-rhombic to ovate and obovate, tapering at base, acute, the lower nearly sessile. Inflorescence sparingly woolly. Raceme compound, dense; flower *white* — Summer — Shady places, Lebanon, Cœlesyria to Cassius, Amanus, Akherdagh, and northward.

Var. **collinus,** Prickles stronger. Inflorescence densely woolly — Common along coast and mountains to Aintâb, and northward.

3. R. discolor, W. et Nees. ♄ Prickles *strong, claw-like.* Leaves ternate or lowermost quinate; leaflets glabrous or sparingly puberulent, pale green above, pannous below, ovate or orbicular, obtuse, acute or acuminate; petiole plano-convex above. Terminal raceme composite; flowers *pink;* fruits with many carpels — Summer — Hedges; common throughout.

5. GEUM, L. Avens.

Calyx-tube, concave or top-shaped, 10-fid, lobes in two rows, the outer five shorter. Petals 5. Receptacle cylindrico-conical, dry. Style elongated after flowering, (in ours) hirsute — Perennial herbs, with odd-pinnatisect leaves, the terminal segment much larger than the lateral.

* *Style deflexed in fruit, its lower joint hooked at apex.*

1. G. urbanum, L. ♃ .5 Root-leaves sometimes round-ovate, cordate, incised-lobed and dentate, long petioled: the other leaves with 5-7 ovate-oblong segments, cuneate at base, incised-dentate. Flowers *erect*, 2-3; petals yellow, longer than calyx-lobes ; *carpophore* 0 ; lower joint of style *glabrous* — Summer — Woods ; subalpine Lebanon, Amanus, Marash, Aintâb, and northward.

* * *Style straight in fruit. Its lower joint not hooked.*

2. G. heterocarpum, Boiss. ♃ Root-leaves with minute lateral, and large terminal, reniform-orbicular segments. Flowers *somewhat nodding*, 5-9 ; petals yellowish-white, *shorter* than calyx-lobes; *carpophore as long as calyx-tube ;* lower joint of style retrosely hispid at apex — Early Summer — Thickets ; Galilee ; subalpine and alpine Lebanon.

6. FRAGARIA, L. Strawberry. *Varola.*

Calyx spreading, the ten divisions in two rows, the outer smaller. Petals 5. Stamens ∞. Carpels ∞, implanted on the surface of a conical receptacle, which becomes fleshy in fruit, and constitutes a spurious berry. Style lateral, short, deciduous — Perennial herbs, with trefoil leaves, white flowers, and stoloniferous root-stock.

F. vesca, L. Wild Strawberry, *Kvbûsh* ♃ Petioles and peduncles hirsute. The whole receptacle covered with carpels—June—Woods ; Cassius, Amanus, and northward.

7. POTENTILLA, L. Cinquefoil.

Calyx spreading, its 10 divisions in two rows, the exterior smaller. Petals 5-4. Stamens ∞. Carpels ∞, inserted on a dry, convex or conical disk. Style lateral, short, deciduous — Perennial herbs or small shrubs, with digitate, trefoil, or pinnate leaves and yellow petals.

* *Receptacle hirsute with long hairs, concealing the usually hirsute carpels.*

1. P. Libanotica, Boiss. ♃ .2 to .3, glandular hirsute ; stem thick, scaly above ; branches simple, compactly corymbose above. Root-leaves long- stem-leaves short-petioled, leaflets *ternate*, nearly sessile, cuneate at base, obovate, crenate-serrate. Petals obovate, longer than calyx, filaments hirsute at base — Summer — Fissures of rocks ; subalpine and alpine Lebanon.

Perhaps P. speciosa, Willd. may be in our district.

* * *Receptacle glabrous, or with hairs no longer than the glabrous carpels.*

† *Perennials.*

‡ *Leaves, at least the lower pinnate.*

2. P. anserina, L. ♃ .3 to .5, stems creeping, rooting at joints. Leaves interruptedly pinnate, with numerous pairs, *silvery-silky* beneath or on both sides, acutely serrate ; stipules sheathing, fimbriated. Flowers *solitary*, long peduncled, *springing from joints*, .015 to .02 broad ; petals obovate, twice as long as calyx-lobes — Summer — Subalpine Lebanon, near Lake Yamûni.

3. P. hirta, L. ♃ .2 to .5, glandular-hirsute, with short wool intermixed ; stems erect. Leaves quinate and septennate, leaflets

hairy, obovate-cuneate, incised-serrate, those of stem linear-cuneate ; stipules entire or incised. Flowers corymbose ; calyx-lobes lanceolate, the outer narrower ; carpels wrinkled, keeled-subulate — Summer — Mountain regions of Lebanon, Cassius, Amanus, and northward.

(*This species seems to me not to be distinct from P. recta, L.*)

4. P. Kotschyana, Fenzl. ♃ .2 to 3, hirsute ; stems ascending, forming a hemispherical tuft, dichotomous, cymose, leafy. Lower leaves quinate, leaflets obovate-cuneate, obtusely serrate or incised at apex ; upper ternate, leaflets oblong or ob-lanceolate, cuneate, more or less deeply incised ; stipules *semi-ovate,* 2-3-*fid* or entire. Fruiting pedicels recurved ; calyx-lobes growing in fruit, lanceolate, nearly equal in length, *the outer mostly* 2-3-*fid;* petals obovate, longer than calyx — Summer — Alpine and subalpine Lebanon, Amanus, and northward.

5. P. geranioides, Willd. ♃ .2 to .3, *hirsute-canescent ;* stems woody, branches decumbent, dichotomous, cymose, few-flowered. Leaves small, fan-shaped, lower long-petioled, upper sessile ; leaflets quinate or septennate, pinnatipartite into *linear, obtuse* segments, the lateral smaller, nearly sessile, the others tapering at base, stalked ; stipules lanceolate and ovate, *entire.* Calyx-lobes lanceolate, *a little unequal; corolla* .008 *broad,* petals obcordate, longer than calyx — Summer — Alpine Lebanon and Antilebanon.

6. P. reptans, L. ♃ .1 to .4, sparsely appressed-hairy ; stems prostrate, rooting at joints. Leaves all petioled, quinate, rarely septennate, leaflets obovate-cuneate, coarsely serrate; stipules ovate, generally entire. Flowers solitary from joints, long peduncled, .015 to .02 broad; calyx-lobes elliptical, acute, nearly equal in length; petals obcordate, longer than calyx — May to July — Waysides and damp places; common.

Var. **major,** Post. All the parts larger. Corolla often .03 broad — Ghauṭah (Damascus); Kessab.

8. ALCHEMILLA, L. Lady's Mantle.

Calyx-tube sub-campanulate, limb 8-parted, the external divisions alternate, smaller. Stamens 1-4, inserted on the ring of the throat. Carpels 1-4 with lateral styles, and ascending ovule. Akenes 1-2, membranous included in calyx — Perennial or annual herbs, with small, green flowers.

1. A. vulgaris, L. ♃ .1 to .5. Root-leaves round-reniform, plicate along the nerves, with 7-9, semi-orbicular, sharply serrate lobes. Calyx-teeth about equal — Summer —

Var. **genuina,** Boiss. Low, smoothish or hirsute ; calyx-lobes as long as tube, or shorter —'Ain es-Sowa'ir, between Jebel Sunnîn and Kenîseh.

2. A. arvensis, L ⊙ .1 to .2; stems numerous, ascending. Leaves .005 to .01 long, fan-shaped, 3-parted into 3-4-fid lobes, the radical soon drying. Inner calyx-teeth ovate, outer minute — May and June — Sandy fields; Jebel Turbul.

9. AGRIMONIA, L. Agrimony.

Calyx-tube top-shaped, having under the 5-fid, at length connivent limb, numerous hooked spines, growing longer and harder in fruit. Petals 5. Stamens 15, inserted with the stamens on the ring at the calyx-throat. Carpels 2, with terminal style. Akene by abortion 1, enclosed in the indurated calyx — Tall, perennial herbs, with flowers in terminal, spike-like racemes, the short pedicel 2-bracted at its middle; fruit pendulous.

A. Eupatoria, L. ♃ Common Agrimony. .3 to .6. Leaves interruptedly pinnate, larger leaflets oblong, coarsely serrate, the smaller ovate, all canescent below. Spike wand-like, often interrupted below ; fruiting calyx deeply grooved to base ; outer spines spreading — Summer — Thickets and fields; common, especially in mountains.

10. POTERIUM, L. Burnet.

Flowers polygamous. Calyx-tube 2-bracted at base, limb 4-parted. Stamens 20-30, inserted on the glandular ring at the throat. Carpels 2-3, style terminal ; stigma brush-like, with filiform divisions; ovule reflexed. Akenes 2-3, included in calyx-tube. Perennial herbs, or shrubs with pinnate leaves, and sessile, capitate or spiked flowers, the pistillate above, and staminate or hermaphrodite below.

* *Unarmed herbs, with .1 to .3 long lower leaves, round, ovate, or oblong, incised-dentate leaflets, capitate, descending inflorescence, and indurated fruiting calyx.*

1. P. villosum, S. et S. ♃ Leaflets minute. Heads smaller than P. Sanguisorba, in a stiff, racemed panicle; fruit .0015 to .002 long. oblong-tetragonal, margined at angles, *obsoletely reticulate at face, and beset with soft, short, rusty-golden wool* — Summer — Between Surug and Urfa.

2. P. compactum, Boiss. ♃ *In tufted clumps, .05 to .10 broad,* sparingly branched below. Heads few-flowered, small ; fruit .0015 long, elliptical, obtusely quadrangular, *smoothish* — Summer — In Rhododendron patches in subalpine region between Kenîseh and Ṣunnîn.

3. P. Gaillardoti, Boiss. ♃ Heads in a long, loose, racemed panicle; fruit .0015 long, elliptical, white margined at angles, *pitted-wrinkled, little or not at all muricate* —Summer — Dry rocks; Lebanon, Cœlesyria, Antilebanon, Amanus, and northward.

4. P. muricatum, Spach. ♃ Heads paniculate; fruit .003 long, oblong, angles *crested, nearly entire,* face crested, muricate — Summer — Grassy places; Galilee to Lebanon, Aintâb, and northward.

5. P. verrucosum, Spach. ♃ Heads corymbose-paniculate ; fruits .004 long, ovate or spherical, obsoletely 4-angled, *beset with elongated, obtuse tubercles, crests of angles indistinct, tubercled like those of face* — Summer — Common.

* * *Thorny shrubs, with apple-like fruiting calyx, and ascending, spiked inflorescence, leaves less than .1 long, leaflets minute, pubescent beneath.*

6. P. spinosum, L. ♄ Thorny Burnet. *Billân.* Branches ending in dichotomous thorns. Spikes terminal, short-peduncled or sessile,

usually interrupted at base — March to June — Rocky places ; common everywhere. One of the "thorns that cracked under the pot." Eccl. vii., 6. One of the Christ-thorns, of which crowns are made and sold in memory of "the crown of thorns." It is so abundant as to form, in many places, a prominent characteristic of the landscape. A county in Antilebanon is named from it, Aqlîm-el-Billân. It is extensively used as fuel in limekilns and ovens.

11. ROSA, L. Rose. *Ward.*

Calyx-tube constricted at throat, by a glandular ring, lobes 5, entire or pinnatifid. Petals 5, destitute of a nectary at base. Carpels often comose on the side opposite to the style — Shrubs, with stipules adnate to the petiole, and odd-pinnate leaves.

1. R. lutea, Mill. ♄ 1 to 2.5. Prickles unequal, some slender, others stout. Leaflets elliptical, doubly serrate, appressed-hirtulous, sparingly glandular below. Flowers solitary, or rarely 3-4 together. Corolla *yellow or light red ;* hip erect, globular, crowned by the persistent, simple sepals — April — Hedges ; Amanus to Aintâb, Marash, and northward.

R. sulphurea, Ait., is extensively cultivated.

2. R. glutinosa, S. et S. ♄ .2 to .5 glandular-viscous. Prickles unequal, some needle-like, often temporary, others stout, curved or straight, *numerous.* Leaflets 5-7, elliptical to round and ovate, .008 to .015 long, bi-serrate, with numerous sessile glands on lower surface. Flowers .015 broad, solitary, peduncled, *pink;* hip globular to ovate .02 long, crowned with persistent calyx-lobes, at length quite succulent, *crimson,* glandular-prickly — Summer — Alpine regions of Lebanon, Antilebanon, Amanus, and northward.

3. R. Thureti, Burnat et Gremli. ♄ .2 to .5, the prickles of the older branches stout, straight, those of the newer more slender. Leaflets small, 5-7, nearly round or round-obovate, glandular, 2-serrate, glabrescent or puberulent, densely glandular on both sides. Flowers small, solitary, pale pink, peduncle and hip glandular-prickly ; ripe hip as large as a cherry — Summer — Subalpine and alpine Lebanon and Hermon.

4. R. canina, L. ♄ Dog Rose. 1 to 2. Branches curved ; prickles *all alike,* stout, claw-like. Leaflets 5-7, ovate to elliptical, acutely 1-2-serrate. Flowers 1-4, pink, .03 to .05 broad, corymbose ; calyx-tube *glabrous* with deflexed deciduous lobes ; hip maturing late, edible, *ovate-urn-shaped,* .01 to .02 long, turning blackish-crimson, *with conspicuous disk* — Summer — A variable species ; common in mountains throughout.

Var. **vulgaris,** Koch. Petioles, leaflets, and peduncles glabrous.

Var. **collina,** Boiss. Petioles and leaflets more or less pubescent, peduncles and hip unarmed or prickly. Petals often white — The commonest Syrian variety.

Var. **Haussknechtiana,** Boiss. As in last, but leaflets small ; stalks of ovaries unequal. Aintâb and Marash, and northward.

5. R. dumetorum, Thuill. ♄ Prickles all alike, stout, hooked. Leaflets 5-7, ovate, 1- or rarely 2-dentate, pubescent on both sides or

on lower surface, petiole pubescent, prickly. Flowers smaller than in last, corymbose, white ; peduncles and outer surface of hip naked or slightly glandular, *inner surface of sepals woolly* — Summer — Lebanon to Aintab, and northward.

Var. **Schergiana,** Boiss. Peduncle, outer surface of receptacle and sepals densely woolly and stipitate-glandular — Antilebanon.

6. R. Arabica, Crep. ♄ Prickles all alike. Leaflets obovate, serrate, sparingly glandular on upper, densely so on lower surface, not hairy. Peduncle, hip, and sepals glandular-puberulent, styles hirtulous, stigmas broad, naked — Summer — Mt. St. Catherine (Sinai).

7. R. Phœnicia, Boiss. ♄ 1 to 3. Prickles scattered, hooked ; branches long, climbing. Leaflets 5, and of upper leaves 3, ovate-elliptical, coarse-serrate, upper surface dark green, lower light green, puberulent. Flowers *corymbose-paniculate, numerous;* calyx-tube glabrous, narrow-elliptical, with caudate, acuminate lobes; petals white, longer than calyx ; ripe hip ovate, .01 long, crimson — May to August — Hedges by ditches ; common.

12. NEURADA, L. Neurada.

Calyx ovate, 5-fid, with contracted throat, at length expanded, flat at base, flattened-conical, echinate. Petals 5, small, inserted with petals into throat of calyx. Styles subulate, at length elongated and exserted, spinescent. Seeds curved — Annual, prostrate herbs, with minute stipules.

N. procumbens, L. ⊙ Woolly-canescent ; stems prostrate, spreading, alternately branched, at length woody. Leaves .015 to .02 long, ovate-oblong, obtusely sinuate-pinnatifid. Flowers solitary, axillary, peduncled; fruit .015 broad — March to May — Sands; Nahr Antelias, el-Ghadîr, around Dead Sea, and southward to Egypt.

13. PYRUS, L. Pear. *Najâs.*

Calyx 5-fid. Petals 5, white. Anthers violet-pink. Ovary 5-celled, styles free. Fruit obovate or spherical, composed of the fleshy mesocarp adherent to the fleshy calyx, more or less studded with stony granules, not umbilicate at base, the 5 cells cartilaginous, 2- or by abortion 1-seeded — Trees with simple deciduous leaves.

1. P. Syriaca, Boiss. ♄ 6 to 10, sometimes spinescent ; buds ciliate. Young leaves cobwebby, old glabrous, somewhat longer than petiole, cuneate or rounded at base, *ovate-lanceolate to lanceolate*, .04 to .06 long, .015 to .035 broad, *crenulate.* Corymbs many flowered ; fruit obovate, .03 long, .02 broad, half as long as peduncle — April and May — Rocky hillsides ; common throughout.

2. P. Boveana, Dec. ♄ 6 to 10 ; buds glabrous. Leaves *linear to linear-lanceolate, entire ;* fruit globular — Antilebanon (Bové). Too near the last.

Several varieties of P. communis, L., the cultivated Pear, are found in the orchards of Syria and Palestine.

14. MALUS, L. Apple. *Tiffâh.*

Calyx 5-fid. Petals 5, pink, with ciliated claw. Ovary 5-celled ; styles adherent at base. Fruit spherical, as in Pyrus, except that it is

destitute of stony concretions, and umbilicate at base. Trees with simple deciduous leaves.

M. communis, Desf. ♄ A hemispherical tree, 5 to 10. Leaves ovate-cuneate, short-acuminate, .05 to .08 long, .03 to .05 broad, crenate. Calyx woolly — April — Several poor varieties are in cultivation. The border of its native area touches ours, but I have not as yet seen wild specimens.

Cydonia vulgaris, Pers., the Quince, *Sepherjel*, is common in cultivation, and its geographical area touches ours.

15. SORBUS, L. Service Tree.

Calyx 5-fid. Petals 5. Ovary 2-5-celled, styles 2-5. Fruit a diminutive pome, with (by abortion) 1-seeded cells with crustaceous endocarp — Trees with serrate, lobed, or pinnate leaves.

* *Ovary* 5-*celled. Leaves palmately trifid. Styles* 5.

1. S. trilobata, Labill. ♄ *Makhlûs. Mahrûs.* Leaves round in outline, cordate at base, lateral lobes spreading, bifid or incised, terminal trifid or *incised* all more or less dentate, obtuse or acute. Corymbs terminal, simple; fruit edible, .01 to .013 long, ellipsoid, crowned with woolly calyx-lobes — Rocky places ; middle zone of Lebanon, 1000 to 1800 m.

Var. **oxyloba,** Boiss. Leaves often 7-lobed, lobes lanceolate, acute — Amanus.

* * *Ovary* 2-*celled. Leaves serrate or lobed. Styles* 2.

2. S. Aria, Crantz. ♄ Leaves round-ovate, elliptical, or obovate, very obtuse, *woolly* beneath, coarsely double serrate or cut-lobed, teeth smaller toward base of leaf. Corymbs branched ; fruit obovate .008 long, .006 broad, red — Spring —

Var. **Græca,** Boiss. Nerves of leaf 5-8 on a side. Leaves .06 to .08 long — Subalpine Lebanon, Antilebanon, and northward.

3. S. torminalis, L. ♄. Leaves glabrous on both sides, rounded, subcordate, or cuneate at base, ovate, with acute, unequally serrate-lobes. Corymbs many-flowered, compound ; fruit ovate or globular, *rust-colored* — Spring.

Var. **pinnatifida,** Boiss. Lobes of leaves more acute, often produced beyond the middle of the limb — Amanus.

16. MESPILUS, L. Medlar.

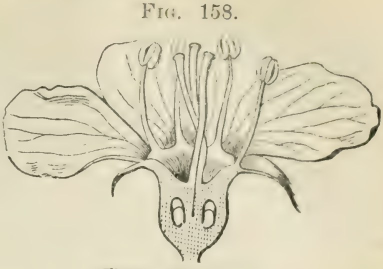
Calyx-lobes 5, leaf-like. Petals 5. Cells of ovary 5, 2-ovuled. Styles 5. Fruit a drupe, crowned with umbilicate disk as broad as itself, surrounded with the calyx-lobes ; pyrenes 5, bony, 1-seeded — A somewhat thorny tree.

M. Germanica, L. ♄ 5 to 8. Leaves short-petioled oblong-elliptical, often denticulate, and acute. Flowers solitary, subsessile among the leaf clusters; calyx-lobes longer than corolla ; petals white, concave, somewhat wavy ; fruit globular-truncate, .02 broad, glabrescent — Spring — About Nablûs and Samaria ; Kerhân near Marash

17. CRATÆGUS, L. Hawthorn. *Za'rûr.*

Calyx-lobes 5, short. Petals 5. Ovary 1-2, rarely 3-5 celled, cells 2-ovuled, styles free. Fruit pome-like, with umbilicate disk, and minute, marcescent lobes, and 1-2, rarely 5, bony, 1-seeded pyrenes—Shrubs or small trees, generally thorny.

Fig. 158.



Flower of Cratægus.

* *Styles and pyrenes* 4-5, *rarely by abortion* 3.

1. C. Orientalis, Pall. ♄ Leaves chartaceous, grey-pubescent on both sides, short-cuneate at base, ovate in outline, pinnately 3-5-parted into incised-serrate or lobed segments. Corymbs dense, white-woolly; fruit large, *brick-colored to blackish-purple* — Spring — Thickets; Gilead and Moab.

* * *Styles and pyrenes* 1-2, *rarely* 3.

† *Fruit as large as a cherry or larger.*

2. C. Azarolus, L. ♄ Leaves chartaceous, *pubescent*, obovate in outline, cuneate at base, undivided or 3-5-fid, with lobes entire or coarsely 2-3 dentate at apex. Corymbs branching, *woolly;* fruit globular, *red or yellow* — April — Hillsides and mountains; common throughout.

† † *Fruit a little larger than a pea.*

3. C. Sinaica, Boiss. ♄ Leaves chartaceous, glabrous, ovate in outline, cuneate at base, some undivided, others 3-5-lobed or parted into obtuse segments, crenate or dentate at apex. Corymbs *simple, few-flowered, glabrous;* fruit ovate-elliptical, contracted at neck — Spring — Sinai.

5. C. monogyna, Willd. ♄ 3 to 4. Leaves puberulent or glabrous, cuneate at base, obovate in outline, deeply 3-7-fid, acutely incised or serrate, sometimes almost undivided. Corymbs loosely puberulent or glabrous; style 1; fruit globular, with 1 pyrene — May — Lower and middle mountain regions, and coast; common throughout.

18. COTONEASTER, Med. Cotoneaster.

Calyx-lobes 5, short, persistent. Petals 5. Ovary 2-5-celled, cells 2-ovuled. Styles 2-5. Fruit small, pome-like, with 2-5, bony, 1-seeded pyrenes, adherent to the fleshy calyx, except at apex — Shrubs with white or pinkish flowers.

* *Thorny. Flowers pentagynous in many-flowered, puberulent cymes.*

1. C. pyracantha, L. ♄ Leaves sub-coriaceous, persistent, short-petioled, *oblong-obovate to oblong*, .02 to .03 long, .01 to .015 broad, *crenate*, glabrous, shining above, pale beneath. Fruit as large as a pea, scarlet — May and June — Hedges; Amanus, and northward.

* * *Unarmed. Flowers 2-3-gynous, in 3-5-flowered, woolly corymbs, shorter than leaves.*

2. C. nummularia, F. et M. ♄ Leaves entire, round-ovate to elliptical, .01 to .013 long, glabrous above, pubescent below. Fruit obovate, half as large as in last, scarlet — May — Rocks ; Lebanon, Antilebanon, and Jebel-ed-Duruz to Amanus, and northward.

ORDER XXXVII. SAXIFRAGACEÆ, (SAXIFRAGE FAMILY).

Herbs or shrubs with the carpels fewer than the petals or calyx-lobes, usually 2, united below, and the 5-6 petals inserted with the (in ours) 4-10 stamens on the calyx, which is free or more or less adherent to the (in ours) 1-2-celled ovary — Flowers regular, hermaphrodite, or rarely diœcious. Calyx withering, persistent. Capsules or berries with several to many, anatropous, albuminous seeds.

**Herbs. Fruit capsular.*

1. SAXIFRAGA. Petals deciduous. Ovary 2-celled. Styles 2. Flowers cymose, axillary, or terminal.

2. PARNASSIA. Petals marcescent. Ovary 1-celled. Stigmas 3-4, almost sessile. Flowers on scapes.

** *Shrubs. Fruit a berry.*

3. RIBES. Petals caducous. Ovary 1-celled. Styles 2. Flowers racemed.

1. SAXIFRAGA, L. SAXIFRAGE.

Calyx 5-fid or -parted, with imbricated lobes. Petals 5, usually equal, hypogynous or perigynous. Stamens 10. Ovary 2-celled above, styles 2. Capsule 2-beaked, opening down between the beaks by a valve on each side. Seeds numerous, on axillary placentæ — Annual or perennial herbs with various habit.

* *Calyx adherent to ovary. Flowers cymose.*

1. S. tridactylites, L. ⊙ Glandular; stem erect, solitary, low, slender, simple or branched, leafy. Root-leaves obovate-spathulate, petioled, undivided or *trifid with divergent lobes.* Petals obovate-cuneate, twice as long as calyx — Spring — Galilee to Lebanon, Antilebanon, Aleppo, Aintâb, and northward.

* * *Calyx free from ovary. Flowers terminal, or from upper axils, solitary.*

2. S. hederacea, L. .1 to .2, glabrous, or glandular-hairy, stems flaccid, tender. Leaves cuneate, truncate, or sub-cordate at base, *round-ovate in outline*, obtusely 3-lobed, the upper often undivided. Petals *white*, obovate, short-clawed, scarcely once and a half as long as calyx — Spring— Shady, moist rocks, and walls; coast and middle mountain regions, from latitude of Tripoli, northward.

3. S. scotophila, Boiss. ⊙ .1 to .2, glabrous, stems flaccid, tender. Leaves reniform with open sinus, or cordate, or truncate at base, repand or obtusely 7-9-lobed, the 3-lobed, or undivided, ovate. Petals *sulphur-colored*, ovate-elliptical, nearly sessile, once and a half as long as calyx — Spring — Damp rocks, caves, and shady places; Lebanon; and Nusairy Mountains to Cassius, Amanus, and northward and eastward. Too near the last.

2. PARNASSIA, L. GRASS OF PARNASSUS.

Calyx 5-parted, with short tube. Petals 5, spreading, marcescent. Stamens 5, alternating with 5, scaly nectaries, which are generally fringed. Ovary 1-celled, style almost 0, stigmas 3-4, nearly sessile. Capsule 1-celled, 3-4 valved. Seeds like sawdust, inserted on parietal placentæ opposite the stigmas— Glabrous, perennial herbs; flowers solitary on long scapes.

P. palustris, L. Grass of Parnassus. ♃ Root-leaves petioled, cordate. Stem-leaves 0 or 1, sessile, ovate-clasping. Petals white, ovate, with connivent nerves, twice as long as calyx-lobes ; nectaries 9-13, glandular-ciliate — Summer — Wet ground ; Zeitûn, and northward.

3. RIBES, L. CURRANT.

Calyx-tube ovoid, adnate to ovary, with a 4-5-fid, regular limb. Petals 4-5, inserted on the throat, alternate with calyx-lobes. Stamens 4-5, opposite calyx-lobes. Ovary 1-celled, many-ovuled, placentæ 2, parietal, opposite. Styles 2, distinct or connate. Berry acid, crowned by calyx-lobes. Seeds horizontal, somewhat angular, with testa, gelatinous without, and crustaceous within — Unarmed or thorny shrubs, with hermaphrodite or diœcious flowers.

R. Orientale, Poir. ♃ .5 to 1, diœcious, glandular-bristly, viscid, bright green. Leaves reniform-orbicular, plaited, 3-5-lobed, obtusely dentate. Racemes erect, the pistillate flowers erect, shorter than the staminate ; small calyx-lobes and petals *greenish-yellow ;* berry red, setulose — May and June — Subalpine and alpine Lebanon and Antilebanon.

ORDER XXXVIII. CRASSULACEÆ. (ORPINE FAMILY.)

Succulent, non-stipulate herbs, with perfect, symmetrical flowers, the petals and carpels equalling the sepals in number (3-20), *and the stamens equal or double their number (rarely more than double)* — Calyx free, cleft or parted. Petals free or united below. Stamens perigynous or hypogynous, free or adherent to petals, inserted with them on the calyx. Follicles membranous or coriaceous, 1-celled, free or united below, with a hypogynous scale at base ; placenta on ventral suture ; ovules numerous or solitary, seeds albuminous.

1. TILLÆA. Parts of flowers all 3-4. Capsules 2-seeded.
2. UMBILICUS. Sepals 5 Corolla gamopetalous. Stamens 10. Capsules ∞-seeded.
3. SEDUM. Sepals 5-4. Petals 5 (or 4, or 6-7). Stamens 10 or 5. Capsules ∞-seeded.
4. TELMISSA. Parts of flower all 3-5. Capsules 1-seeded.

1. TILLÆA, L. TILLÆA.

All the parts of the flower 3-4, free, the capsules 2-seeded, constricted between the seeds — Minute, annual, glabrous herbs, with opposite leaves.

T. muscosa, L. ⊙ .02 to .03, stems simple or sparingly branched, flowering from base. Leaves oblong-lanceolate, mucronate, connate at base. Flowers axillary, *sessile;* calyx-lobes lanceolate, mucronate—March and April — Rocks and damp walls; along coast, and hill country to 1000 m.

Var. **trichopoda,** Post. Flowers with pedicels, at length as long as they. (*T. trichopoda, Fenzl.*)

2. UMBILICUS, D.C. Umbilicus.

Calyx 5-parted. Corolla tubular, campanulate, or urn-shaped, more or less deeply 5-cleft. Stamens 10, inserted on tube of corolla. Carpels 5, many-seeded. Perennial or annual herbs, with various habit.

* *Root-leaves petioled, not imbricated. Flowers spiked.*

† *Root-leaves reniform-cordate or sub-peltate. Flowers ascending.*

1. U. erectus, D.C. ♃ .4 to .8. Stem-leaves minute, sub-sessile, *ovate*, acutely dentate. Flowers ascending, forming a simple or branched spike, .3 to .4 long; bracts linear-lanceolate, longer than pedicel; corolla *yellow*, .012 long, obconical-tubular, 4-5 times as long as calyx, *cleft to middle* into lanceolate, acuminate lobes — July — Shady rocks; lower and middle Lebanon and Hermon, and northward.

† † *Root-leaves peltate, repand-crenate. Flowers horizontal or pendulous.*

2. U. pendulinus, D.C. Pennywort. Navelwort. ♃ .2 to .5. Upper stem-leaves oblong-cuneate to oblong-linear and linear-subulate, scattered. Flowers pendulous or horizontal, in a simple or branched spike; corolla yellowish-white, tubular, four times as long as calyx, cleft for one-fourth its length into ovate, acute lobes — Spring — Clefts of damp cliffs and walls; common throughout.

Var. **genuinus.** Pedicels pendulous, longer than bracts.

Var. **intermedius.** Pedicels pendulous, shorter than bracts or 0. (*U. intermedius, Boiss.*)

Var. **horizontalis.** Pedicels horizontal, shorter than bracts, or 0. (*U. horizontalis, Guss.*)

* * *Root-leaves sessile, imbricated as in the House Leek.*

3. U. Libanoticus, Labill. ♃ .1 to .3, glandular-pubescent. Lower leaves spathulate, obtuse; stem-leaves the same, or linear-oblong to obovate-oblong. Panicle more or less dense thyrsoid, or loose cymose; pedicels shorter than calyx; corolla pink to purple, cleft to beyond middle into oblong-lanceolate, mucronate lobes — May to August — Clefts of rocks; common throughout. A variable species, perhaps to be referred to U. Sempervivum, L.

Var. **genuinus.** *Green.* Root-leaves cuneate, tapering at base. Corolla scarcely cleft to middle.

Var. **connivens.** Corolla-lobes lanceolate, acute, at length *plicate, connivent.* (U. globulariæfolius, Fenzl.)

Var. **Pestalozzæ.** *Glaucous.* Rosette of root-leaves dense, short, margin of leaves obsoletely dentate. (*U. Pestalozzæ, Boiss.*)

Var. **lineatus.** *Green.* Root-leaves loosely rosetted, *lingulate-spathulate*, ciliate. Corolla cleft to one-third its length into triangular-ovate lobes, *striate.* (*U. lineatus, Boiss.*)

3. SEDUM, L. Stone Crop. Orpine.

Calyx 5-4-parted. Petals 5 (rarely 4 or 6-10), free or united only at base. Stamens 10 (rarely 5 or 10-12), perigynous, alternate, adnate to petals. Capsules ∞-seeded — Perennial or annual herbs with various habit.

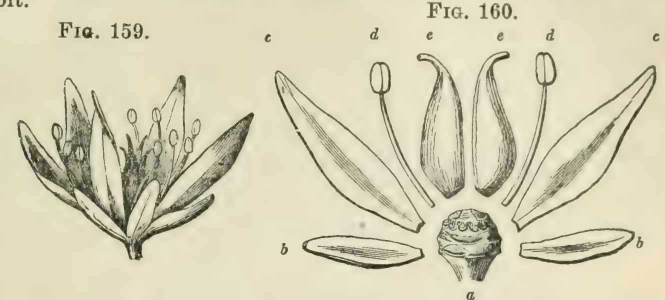


Fig. 159. Flower of a Sedum with all the parts of the flower in position.
Fig. 160. The same showing (*a*) the torus, (*b b*) two of the sepals, (*c c*) two of the petals, (*d d*) two of the stamens, (*e e*) two of the carpels.

* *Perennials. Root-stocks and stolons bearing fertile and sterile stems.*

† *Leaves flat. Inflorescence loosely cymose-corymbose. Flowers pink.*

1. S. stoloniferum, Gmel. ♃ Leaves opposite, *elliptical to ovate and rhombic, obtuse, repand-crenate*, .005 to .01 long, minutely tubercled. Fertile, stems .1 to .2 ; flowers .006 broad, sub-sessile; sepals oblong; petals lanceolate, acute, twice as long as calyx — June — Moist rocks; Amanus, and northward.

† † *Leaves half-terete or cylindrical. Inflorescence various.*

‡ *Flowers white.*

2. S. album, L. ♃ *Glabrous*, green. Leaves semi-cylindrical, flattened above, *those of sterile stems oblong*, *obtuse*, .006 *long*, .003 *wide*, *those of fertile*, *oblong-linear*, *obtuse*, .006 *long*, .002 *wide*. Fertile stems .1 to .15, dichotomously panicled-corymbose; flowers .004 broad, pedicel longer than calyx ; petals lanceolate, rather obtuse, 3-4 times as long as ovate, obtuse calyx-lobes — Summer — Clefts of rocks; Lebanon to Amanus, and northward.

‡ *Flowers yellow.*

§ *Leaves obtuse.*

3. S. Laconicum, Boiss. et Held. ♃ Glabrous, cespitose. Leaves linear, nearly cylindrical, sessile, .006 to .008 long, .002 broad, those of short, sterile stems densely imbricated. Fertile stems 1. high, 2-3-fid beneath the terminal cyme, *with short*, *sessile*, 2-4-*flowered racemes ;* flowers *sessile*, .004 broad ; petals lanceolate, acuminate, twice as long as oblong obtuse, calyx-lobes — May to July — Rocks; middle and subalpine region ; Samaria and Nazareth to Lebanon, and northward.

§ § *Leaves acute or acuminate.*

4. S. altissimum, Poir. ♃ Glabrous, glaucous, *woody at base. Leaves oblong to lanceolate*, semi-terete, erect, sessile, .005 to .015 long, .003 broad, sparse on fertile, dense on short, sterile stems. Fertile stems

.5 to .7 high, *stout;* cymes corymbose, with *scorpioid branches;* flower short pedicelled, .008 broad; petals linear-oblong, 2-3-times as long as ovate, acutish calyx-lobes — Summer — Rocks; coast, and coast range of mountains to 1000 m.

5. **S. amplexicaule**, D.C. ♃ Glabrous, indurated at base. Sterile branches ending in *a cylindrical bud, composed of densely imbricated leaves with a white, dilated, membranous, clasping base, and subulate or needle-like apex*, .01 *to* .015 *long; base of fertile stem sheathed with similar leaves; upper leaves cylindrical-linear, subulate, spurred at base, soon deciduous.* Fertile stems .1 to .2 high, slender; branches of cyme 2-3, few-flowered; flowers sessile or short pedicelled, .01 broad; petals often 6-10, linear-acuminate, twice to twice and a half as long as lanceolate, acute calyx-lobes — May and June — Dry rocks; Lebanon and Antilebanon, and northward.

Var. **uncatum**, Post. Leaves of sterile branches ending in a hooked awn — Lebanon, above ĕl-Ma'âsir.

* * *Annuals or monocarpic. Leaves semi-terete or cylindrical.*

† *Flowers* 10-12-*androus.*

‡ *Petals white, or pink.*

6. **S. glaucum,** W.K. ⊙ or ② .05 to .15, glabrous or hairy above, glaucous; stem often branching from base. Leaves linear, somewhat flattened. Branches of cyme 2-6, scorpioid; flowers one-sided, usually 6-merous; calyx-lobes ovate, acute; petals with deep pink keel, lanceolate-cuspidate; carpels flattened, conical, .005 long, .002 broad, generally tubercled — February to April — Rocks; common, especially in mountains.

Var. **eriocarpum,** Boiss. Carpels more or less hairy — Common.

Var. **polypetalum,** Boiss. Petals often 7-9. Carpels elongated, acute, glabrous — Common.

Var. **pallidum,** Post. Flowers usually pentamerous, smaller than type — Less common than the others (*S. pallidum, M.B.*)

7. **S. Steudelii,** Boiss. ⊙ .02 to .05. Stem simple or branched below middle. Leaves glabrous, semi-terete, often .015 to .016 long. Branches of cyme 2, puberulent, 1-3-flowered; floral leaves overtopping sessile flowers; calyx-lobes ovate, acute; petals lanceolate acuminate; carpels lanceolate, acute, glandular-hairy — April — Rocks, near Aleppo.

‡ ‡ *Petals yellow or yellowish-white, with pinkish keel.*

8. **S. littoreum,** Guss. ⊙ Glabrous; stem .05 to .1 *thick*, simple, or with clustered branches. Leaves *spathulate-cuneiform*, semicylindrical. Branches of cyme 1-3, recurved; flowers sub-sessile, .003 broad, not spreading. Calyx-lobes unequal, *semi-terete, ovate, obtuse, two-thirds as long* as pale yellow, lanceolate, acute or mucronate petals — Spring — Common along coast.

9. **S. Palæstinum**, Boiss. ⊙ Glabrous or minutely glandular above; stem .05 to .1, branching from base or above. Leaves semicylindrical, linear, obtuse. Branches of cyme 2-3, scorpioid; flowers sessile, 5-merous; calyx-lobes *ovate-triangular, one-sixth* as long as

oblong, abruptly cuspidate petals ; carpels lanceolate, glandular — Spring — Rocks ; common.

10. S. Assyriacum, Boiss. ⊙ Glabrous, stem .06 to .1, with clustered branches to or below middle. Leaves semi-terete, *linear*, .015 to .018 long. Branches of cyme as in last ; pedicels about as long as calyx ; calyx-lobes *lanceolate*, acute, one-third to one-fourth as long as elliptical-lanceolate, obtuse or acute petals — Spring — Rocks.

Var. **minus**, Boiss. .03 to .04, with more acuminate petals — Anti-lebanon.

† † *Flowers* 5-*androus. Petals pink or white.*

11. S. rubens, L. ⊙ *Glandular-pubescent above;* stem .06 to .1, simple or branched. Leaves semi-cylindrical, obtuse. Cyme corymbose, one-sided; flowers sessile: calyx-lobes triangular, acute, one-third as long as glandular-pubescent, lanceolate, acuminate, *pink* petals — Spring — Near coast, and in coast range of mountains.

12. S. cespitosum, Cav. ⊙ *Glabrous;* stems low. Leaves *ovate*, obtuse, *imbricated.* Branches of cyme 2-3, stiff ; flowers sessile ; calyx-lobes lanceolate, half as long as lanceolate, white petals — Spring — Sandy and rocky places ; Bethany to Damascus, Aleppo, and northward.

4. TELMISSA, Fenzl. Telmissa.

Calyx 3-5-parted. Petals 3-5, free. Stamens 3-5, perigynous. Capsules 3-5, with 1 seed, suspended from apex — Dwarf annual herbs, distinguished from Sedum by 1-seeded capsules.

T. microcarpa, Smith. ⊙ Glabrous ; stems simple or branching from below, .1 to .15. Leaves semi-cylindrical, obtuse, succulent, Cyme with 2-3, long, loosely spiked, rigid, leafy branches ; flowers .001 long, sessile, *not in axils;* calyx-lobes minute, dentiform ; petals pinkish-white, oblong, thrice as long as calyx ; carpels prismatic, tubercular-punctate, abruptly mucronulate — Spring — Rocks and stony places ; common in middle mountain region, and central and eastern plains.

Order XXXIX. DROSERACEÆ, (Sundew Family).

Glandular-hairy bog-herbs, with regular, 5-*merous, hypogynous flowers, withering-persistent calyx and corolla, stamens with extrorse anthers, and a* 1-3-*celled pod with parietal placentæ and* 1-5 *styles* — Calyx imbricated. Petals convolute. Seeds numerous, anatropous. Fruit capsular, membranous, loculicidal ; embryo minute at base of albumen. A small order, of no known virtues. The plants of this family impart a purple color to the drying papers.

DROSERA, L. Sundew.

Calyx deeply 5-cleft. Styles 3-5. Capsule 1-celled, stipitate. Seeds minute, reticulate.

D. rotundifolia, L. Round-leaved Sundew. ♃ Leaves *orbicular*, abruptly narrowed into broad petioles. Flowers white — Mossy banks ; Bikfaya ; 'Ain-es-Sawa'îr. Meirûba.

ORDER. XL. HALORAGEÆ, (WATER MILFOIL FAMILY).

Aquatic herbs, with minute, axillary, sessile, hermaphrodite or monœcious flowers, calyx-tube adherent to ovary, petals inserted on the throat of calyx, cells of ovary 1-*ovuled, stigmas as many as cells of ovary* — Calyx-limb truncate, or 2-4 parted. Petals as many as calyx-lobes. Stamens 1-8. Ovary 1-4-celled ; ovules anatropous, pendulous. Fruit nut-like or drupaceous, indehiscent, 1-4-celled, separating into pyrenes. Seeds albuminous.

1. MYRIOPHYLLUM, L. WATER MILFOIL.

Flowers monœcious. *Staminate*:—Calyx-tube rounded, limb 4-parted, caducous. Petals 4, caducous. Stamens 8. *Pistillate*:—Calyx-tube tetragonal, limb small. Petals minute, rudimentary, deflexed. Stigmas 4, villous, persistent. Ovary 4-celled. Drupe drying, and separating into 4 pyrenes — Aquatic herbs, with verticillate, opposite, or alternate, dentate or pinnatipartite leaves, the staminate flowers above the pistillate.

M. spicatum, L. ♃ Leaves pinnatipartite into setaceous lobes. Whorls of flowers arranged in terminal spikes, naked at apex ; floral leaves as long as flowers — Summer — Jordan Valley, Cœlesyria and Orontes Valley, and northward.

2. CALLITRICHE, L. WATER STARWORT.

Flowers monœcious, naked, or with 2, opposite, translucent, stalked bractlets. Calyx-lobes 0. Corolla 0. *Staminate*:—Stamen 1, with elongated, slender filament, anther 2-celled, dehiscent by a semi-circular slit. *Pistillate*:—Styles 2, subulate. Ovary of 2 carpels, 4-celled by means of false septa. Drupe dry, compressed, coriaceous, at length separating into 4, indehiscent mericarps — Tender, aquatic herbs, with opposite, decussate, entire leaves.

C. vernalis, Kūtz. ♃ Leaves of lower branches linear, of upper linear-spathulate to obovate, .003 to .005 long. Styles erect, usually fugacious ; fruit .001 long, longer than broad, mericarps somewhat keeled — Spring and Summer — Stagnant water.

ORDER XLI. MYRTACEÆ, (MYRTLE FAMILY).

Trees or shrubs, with regular, hermaphrodite flowers, calyx-tube adherent to ovary ; limb cleft into imbricated lobes ; petals as many as calyx-lobes, inserted on throat ; the stamens (*in ours*) ∞, *free, inserted on throat ; ovary several-celled, with central placentæ ; style and stigma* 1 ; *ovules numerous ; fruit* (*in ours*) *a berry, with exalbuminous seeds.*

MYRTUS, L. Myrtle. *Rihân. Aâs.*

Calyx-tube nearly globular, the limb 5-parted even in the bud. Petals 5, spreading. Stamens numerous, in several rows ; anther-cells parallel. Berry 2-3-celled, crowned with calyx-lobes ; seeds kidney-shaped — An evergreen, aromatic shrub.

M. communis, L. ʒ Common Myrtle. *Aâs. Rîhân.* .5 to 1.5 ; twigs tetragonal. Leaves opposite, coriaceous, short-petioled, ovate-lanceolate, acuminate, pellucid-dotted. Peduncles solitary, axillary, shorter than leaves ; petals white, nearly thrice as long as calyx-lobes ; berry blackish-blue, somewhat glaucous, edible — Spring and Summer — Common on hillsides, and especially flourishing by watercourses ; coast and mountains to 1000 m.

Order XLII. GRANATEÆ, (Pomegranate Family).

Small trees, with regular, hermaphrodite flowers, calyx-tube adherent to ovary, lobes valvate in æstivation ; petals 5-7, *inserted, with the numerous stamens, on throat of calyx ; ovary many-celled, free; style* 1 ; *fruit capsular* — An order separated from Myrtaceæ by valvate calyx-lobes, and leaves without dots, and from Lythrarieæ by calyx-tube more or less adherent to ovary.

PUNICA, L. Pomegranate. *Rummân.*

Calyx woody-coriaceous, top-shaped, lobes 5-7. Petals 5-7, lanceolate, corrugated. Stamens very numerous, in many rows. Ovary with two tiers of cells, the lower consisting of 3, and the upper of 5 ovules attached to tumid placentæ, on the septa and walls. Capsule surrounded by a thick crust, crowned by the persistent, woody calyx-lobes ; seeds angular, pulpy ; embryo straight, cotyledons spirally convolute — A large branching shrub, or small tree, with showy, scarlet blossoms.

P. Granatum, L. ʒ *Rummân.* 3 to 4, branches opposite or alternate, often thorny. Leaves opposite, alternate, or clustered, caducous, oblong-oblanceolate — Summer — Common in cultivation, and wild along northern borders of our district, and possibly in Gilead.

Order XLIII. LYTHRARIEÆ, (Loosestrife Family).

Herbs or shrubs with regular, hermaphrodite flowers, entire leaves, no stipules, the calyx persistent, free, from the 2-9-*celled, many-seeded ovary and membranous pod, and bearing the deciduous petals, if any, on its throat, and* 4-14 *free stamens lower down ; style filiform*—Calyx valvular in the bud, bearing appendages between its lobes. Petals 4-7 or 0, often corrugated. Plancentæ central, ovules anatropous, not albuminous. Capsule sometimes 1-celled by disappearance of septa, septicidal, opening by a lid, or irregularly torn.

1. AMMANNIA, L. Ammannia.

Calyx campanulate, 4-lobed, with sometimes obsolete appendages. Petals 4 or 0. Stamens 4 or 8. Stigma capitate. Capsule 1-2-celled — Annual herbs, with opposite or whorled, entire leaves, and small axillary flowers.

A. verticillata, Lam. ⊙ Glabrous, glaucescent, erect, simple or branched. Leaves oblong or oblanceolate, obtuse. Flowers sessile or nearly so in the axils, clustered; calyx-lobes triangular, acute, spreading; teeth between lobes small, sometimes 0; petals purple, small, often 0; stamens 4 — Summer — Rice fields and swamps; Marash.

2. LYTHRUM, L. Loosestrife.

Calyx tubular-cylindrical, ribbed, 8-12-toothed. Petals 4-6. Stamens 8-12 or fewer, inserted at the bottom or middle of calyx-tube. Placentæ thick, adnate to septum — Annual or perennial herbs, with opposite or alternate leaves, the purple flowers axillary or in spiked whorls.

* *Flowers in spiked whorls. Tall, showy plants.*

1. L. Salicaria, L. ♃ Stem *stout, erect,* 1 to 4. Leaves cordate-lanceolate to lanceolate-linear, acute, opposite or whorled. Whorls of leafy spike dense, shorter than floral leaves; calyx 12-nerved, *the inner 6 teeth triangular, the outer longer, subulate;* corolla .008 broad; stamens 12 — Summer — Banks and moist places; common to 1000 m.

Var. **Syriacum,** Boiss. et Gaill. Glabrous except scabrous borders of leaves and bracts — Wadi Barada.

Var. **tomentosum,** D.C. Woolly or canescent — Very common.

* * *Flowers axillary, solitary.*

2. L. Græfferi, Ten. ♃ Stems *usually diffuse,* sometimes erect. Lower leaves *elliptical-oblong, often cordate,* the upper linear-lanceolate to linear, *spreading.* Flowers 10-12-*androus, longer stamens exserted; calyx-teeth* 12, *nearly equal, triangular;* petals *twice* as long as calyx — Spring and Summer — Ditches, borders of streams, and swampy ground; common along coast and interior to 1000 m.

3. L. hyssopifolium, L. ♃ .3 to .5; stems densely leafy, *usually erect,* sometimes diffuse. Lower leaves oblong to linear-oblong, the others linear-lanceolate to linear, *ascending or slightly spreading. Flowers* 6-*androus, stamens all included; the outer calyx-teeth long, subulate, the inner minute, triangular;* petals *once and a half* as long as calyx — Spring and Summer — Moist and dry sand; along coast; Damascus.

3. LAWSONIA, L. Henna. *Ḥenneh.*

Calyx-tube very short, top-shaped, 4-angled, lobes 4, spreading, ovate, destitute of accessory teeth. Petals 4, corrugated, inserted at apex of calyx-tube. Stamens 8, in pairs, alternate with petals, inserted at base of tube. Capsule globular, 4-celled, irregularly torn at maturity. Placentæ thick, adnate to axis; seeds numerous.

L. alba, L. ♄ Henna. *Ḥenneh.* Branches opposite, terete, often spinescent. Leaves short-petioled, oblanceolate to obovate, entire. Corymbs many-flowered, paniculate at apex of branches — Spring — General in cultivation, and escaped.

ORDER XLIV. **ONAGRARIÆ,** Juss. (EVENING PRIMROSE FAMILY).

Herbs with hermaphrodite, (in ours) regular flowers, the calyx-tube adherent to the 2-4-celled ovary, the lobes valvate in the bud; the stamens as many or twice as many as the petals — Calyx-limb 4-6- or rarely 2-parted. Petals as many as calyx-lobes, alternate with them, contorted in the bud. Stamens inserted with the petals at the throat of the calyx. Ovary 1-∞-celled. Style filiform, stigma capitate or 4-5-lobed. Ovules anatropous, 1-∞ in cells. Fruit capsular or nut-like. Seeds with or without albumen.

1. **EPILOBIUM,** L. WILLOW-HERB.

Calyx-tube scarcely prolonged beyond the ovary; limb 4-cleft, deciduous. Petals 4. Stamens 8, with linear or oblong anthers. Stigmas 4, cruciform, or coalesced in a knob. Pod linear, 4-celled, loculicidal, the valves separating from the 4-angled, seed-bearing column; seeds numerous, with a tuft of long hairs at apex — Perennial herbs, growing in marshy places, with alternate or opposite leaves, and spiked or racemed, pink, white or violet flowers.

* *Shoots not separated from root. Flowers crateriform. Stamens reflexed.*

1. E. spicatum, Lam. ♃ Rose Bay. 1. Leaves lanceolate, entire or obsoletely glandular-serrate. Raceme terminal, .3 to .4 long, leafless or leafy only at base; petals obovate, pink, short-clawed; style villous above base, somewhat longer than stamens— Summer — Subalpine and alpine Lebanon, and probably Amanus.

* * *Stolons formimg new, at length separate plants. Flowers funnel-shaped. Stamens erect.*

† *Stem terete, not angled or keeled.*

2. E. hirsutum, L. .6 to 1. Villous and glandular-pubescent. Leaves more or less hirsute, oblong-lanceolate to linear-lanceolate, cuspidate, denticulate, clasping, somewhat decurrent. Calyx-lobes lanceolate, *aristate;* corolla pink, .012 to .015 broad — Summer and early Autumn —

Var. **tomentosum,** Boiss. More or less canescent — Much commoner than type; coast and interior to 1500 m.

3. E. parviflorum, Schreb. .5 to 1, velvety-pubescent. Leaves except lowermost sessile, lanceolate, acute, denticulate. Calyx-lobes oblong, acute, muticous, three-fourths as long as *violet or white, inconspicuous,* .002 *broad corolla* — Summer — Common in mountains to 2000 m.

Var. **menthoides,** Boiss. Leaves ovate-oblong, rather obtuse — Subalpine Lebanon.

† † *Stems angled with* 2-4-*elevated, decurrent lines.*

4. E. tetragonum, L. ♃ *Adhnâb-el-Quṭṭah.* .4 to .8, sparingly appressed crisp-puberulent or glabrescent. Leaves lanceolate, denticulate, *gradually tapering to apex,* the lower somewhat petioled, the intermediate somewhat decurrent. Calyx-lobes *linear-lanceolate, acuminate,* two-thirds as long as *pink,* .005 *broad corolla* — Summer — Coast and interior to 1000 m.

Var. **Tournefortii,** Post. Flowers .006 to .01 broad and long. Stem more prominently angled. (*E. Tournefortii, Michal.*)

Var. **minutiflorum,** Boiss. Flowers minute. Stem obsoletely angled — Aintâb.

5. E. roseum, Schreb. ♃ .3 to .5, pubescent. Leaves petioled or sub-sessile, *oblong-ovate, more or less tapering at base, acutish at apex,* unequally denticulate. Calyx-lobes *oblong-ovate, cuspidate,* three-fourths as long as .005 broad, pink corolla — Summer — Subalpine Lebanon.

Var. **subsessile,** Boiss. Leaves nearly sessile, sub-cordate at base. More or less canescent — Subalpine Lebanon. Hamath.

2. JUSSIÆA, L. Jussiæa.

Calyx-tube not produced beyond ovary ; lobes 4-6, acute, persistent. Petals as many as calyx-lobes, spreading. Stamens 8-12, anthers ovate or oblong. Stigma 4-6-lobed. Capsule crowned by calyx-lobes, terete or angled, 4-6-celled, septicidal. Seeds numerous, naked, inserted on margins of valves, or on placentæ which separate from valves — Perennial, marsh herbs, with alternate leaves and yellow flowers.

1. J. repens, L. ♃ *Qatif. Meddâd. Furga. Fureikâl.* Glabrous, floating, furnished with vesicles and rootlets at base of stems. Leaves petioled, oblong-obovate to lanceolate. Flowers solitary, .025 broad, axillary, peduncled ; calyx-tube terete, hirtulous, tapering at base, with 5, lanceolate, acute lobes; petals obovate, twice as long as calyx-lobes — May to October — Streams and marshes ; coast and Jordan Valley, and northward.

2. J. augustifolia, Lam. ♃ Glabrous. Leaves subsessile, linear-lanceolate, tapering at both ends. Flowers short-peduncled ; calyx-lobes 4, very acute, tube cylindrical, elongated — Spring — Ḥûleh (Tristram).

Order XLV. CUCURBITACEÆ, Juss. (Gourd Family).

Herbaceous, climbing or prostrate vines, usually tendril-bearing, with diœcious or monœcious, yellow or whitish-yellow, (often monopetalous) 5-merous flowers, the calyx-tube adnate to the 3-5-*celled ovary, and the* 3-5 *stamens free, or monadelphous or triadelphous by cohesion of their usually tortuous anthers. Pepo fleshy or membranous* — Calyx-tube short-campanulate. Corolla inserted on the throat of the calyx. Placentæ 3, parietal, implanted at the outer angles of the cells ; numerous, horizontal seeds, not albuminous ; embryo straight.

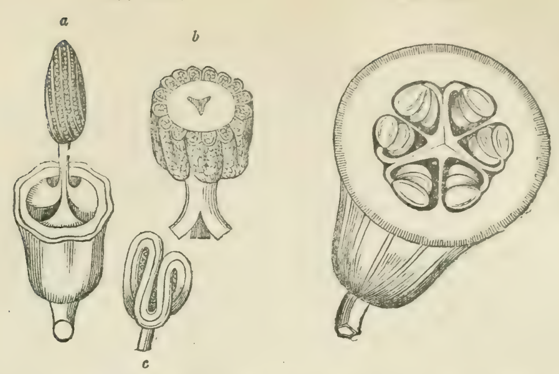


Fig. 161. (*a*) Triadelphous stamens of the gourd, with syngenesious anthers. (*b*) Transverse section through the anthers. (*c*) Anther of a watermelon forming three loops.
Fig. 162. Transverse section of a gourd, showing its three parietal, bifid placentæ.

* *Stamens* 3, *free. Flowers* (*in ours*) *monœcious.*

† *Calyx with* 1-3 *scales at fundus.*

1. MOMORDICA. Both kinds of flowers solitary. Tendrils simple.

† † *Calyx destitute of scales at fundus.*

‡ *Connective of anther-cells appendaged.*

2. CUCUMIS. Staminate flowers usually clustered, pistillate solitary. Tendrils simple.

‡ ‡ *Connective of anther-cells not appendaged.*

3. CITRULLUS. Both kinds of flowers solitary. Tendrils branched.
4. ECBALLIUM. Staminate flowers racemed, pistillate solitary. Tendrils 0.

* * *Stamens* 5, *triadelphous. Connective not appendaged. Flowers diœcious or monœcious.*

5. BRYONIA. Flowers all racemed or clustered. Tendrils simple or bifid.

1. MOMORDICA, L. Momordica.

Corolla rotate, 5-parted to base, with obovate, ribbed petals. *Staminate fl.* :— Pedicel with a sessile bract at base. Stamens 3, anthers adherent, at length free. *Pistillate fl.* :—Ovary oblong, style slender, stigmas 3. Fruit an irregularly torn or 3-valved berry —Climbing herbs with yellow flowers.

M. balsaminea, L. ⊙ *Beilasân.* Monœcious. Leaves palmately 5-lobed or parted, sparingly rough-puberulent or glabrous, with coarse dentate lobes and rounded sinuses. *Staminate fl.* :— Bract cordate, dentate, petals twice and a half as long as calyx. Fruit round-ovate, angled, tubercled, *orange colored*, bursting irregularly ; seeds flattened-elliptical, somewhat wrinkled-tubercled — Summer — Nooks by east shore of Dead Sea.

2. CUCUMIS, L. Cucumber. *Jelmâtha. Khiyâr.*

Corolla 5-parted beyond its middle, campanulate, lobes oblong-ovate, acute. *Staminate fl.* :—Stamens 3, free, anthers oblong. *Pistillate fl.* :—Rudimentary stamens 0. Ovary ovate, with a short style and three obtuse stigmas; fruit fleshy, indehiscent, with flattened seeds — Prostrate herbs with yellow flowers.

1. C. prophetarum, L. ♃ *Nâfi'ah. Henedlai.* Scabrous, grey; root thick, vertical; stems numerous, angled-grooved, prostrate, geniculate at joints. Leaves .015 to .02 long and broad, firm, cordate-ovate or palmately 3-5-lobed, with crisp-denticulate margin; tendrils short. Flowers minute; fruit .01 to .02 long, ovoid-ellipsoid, *beset with non-poisonous prickles*, marked with longitudinal, white lines; pulp bitter — February and March — Dead Sea to Sinai, and southward.

2. C. trigonus, Roxb. ♃ Tubercled-scabrous; stems numerous, slender, elongated. Leaves .02 to .05 long and broad, cordate-orbiculate, obtusely palmately 3-5-lobed, acutely denticulate; tendrils short. *Staminate fl.* 2-3 in a cluster. *Pistillate fl. as large as those of C. Melo*, solitary; ovary villous-woolly; fruit as large as a pigeon's egg, *velvety*, becoming glabrous, with longitudinal vittæ and bitter pulp — Spring — Ghor-es-Ṣâfieh to Ḥûleh, Marash, and eastward and southward.

There are cultivated of this genus C. Melo, the Muskmelon, *Baṭṭikh asfar*, C. Citrullus, or Citrullus vulgaris, L., the Watermelon, *Jabas or Baṭṭikh akhdar*, C. sativus, L., the Cucumber, *Khîyâr*, C. Chate, L., *Muqti*, and C. Dudaim, L.

3. CITRULLUS, Schrad. Bitter Cucumber.

Flowers all solitary. Corolla 5-parted beyond middle, nearly campanulate, with obtuse segments. *Staminate fl.* : — Anthers slightly coherent. *Pistillate fl.* :— Rudiments of stamens strap-shaped; ovary ovate, with a short style and 3 fleshy, reniform stigmas; fruit globular or ovate, fleshy or dry, indehiscent, with flattened seeds — Prostrate herbs.

C. Colocynthis, L. ♃ Colocynth. *Ḥondol.* Scabrous, grey; root fleshy, vertical. Leaves triangular in outline, deeply 3-7-lobed or parted, lobes lobulated or incised, with rounded sinuses. Fruit globular, .1 in diameter, smooth, mottled with green and yellow, fungous within, intensely bitter; seeds smooth, shining, without margins — March to July — Sandy places near the Mediterranean, Red, and Dead Seas; near Beersheba. The pulp of the fruit is an officinal, drastic cathartic.

The Colocynth may be intended by *gall* in Deut. xxix. 18, Ps. lxix. 21, Jer. viii. 14, ix. 15, xxiii. 15, Lam. iii. 5, 19.

4. ECBALLIUM, Rich. Squirting Cucumber.

Corolla broad-campanulate, deeply 5-lobed, lobes oblong, acute. *Staminate fl.* racemed; anthers broad. *Pistillate fl.* : — Stamens imperfect; ovary oblong; style short; stigmas 3, with bifurcate, subulate points; fruit oblong, echinate, watery, separated at maturity from its peduncle, and contracting elastically at base, in such manner as to squirt out its juice and oblong seeds to a considerable distance — Prostrate or ascending herbs, without tendrils.

E. Elaterium, L. ♃ Elaterium. *Qiththâ-el-Ḥamâr.* Scabrous, stout, fleshy. Leaves long-petioled, canescent on under surface, cordate-ovate or triangular, irregularly repand-dentate or 3-lobed. Flowers pale-yellow, axillary, the *staminate* peduncled, the pistillate often arising from the same axil as the staminate; fruit nodding, ovoid,

pubescent ; seeds oblong, smooth — All the year — Waste places and roadsides; everywhere. The inspissated juice is an exceedingly drastic and irritating, officinal cathartic.

5. BRYONIA, L. Bryony.

Flowers racemed or clustered, the pistillate rarely solitary. Corolla campanulate, 5-parted. *Staminate fl. :* — Stamens 5, triadelphous, with linear cells. *Pistillate fl. :* — Style 3-fid; fruit baccate, spherical, indehiscent — Perennial, climbing herbs (ours diœcious), with fleshy tuberous root, and usually simple tendrils.

B. multiflora, Boiss. et Held. ♃ Leaves scabrous, cordate-ovate, 8-9-palmatilobed or parted, segments often lobulated, sometimes entire, repand-dentate or obsoletely lobed. Fertile flowers in many-flowered, peduncled racemes, sometimes branching at base, sometimes few-flowered ; calyx shorter than corolla ; style somewhat exserted ; berry yellow or scarlet .008 to .01 in diameter — June — Thickets ; common.

Var. **pauciflora,** Post. Flowers solitary, or 2-few in racemes (*B. Syriaca, Boiss*). The author has in his herbarium numerous forms intermediate between this variety and B. multiflora. In several the lower leaves are obsoletely lobed, and the upper lobed, and more or less lobulated.

Order XLVI. DATISCACEÆ, Endl. (Datisca Family.)

Trees, or (ours) herbs, with regular, diœcious flowers; calyx adherent to 1*-celled ovary ; petals* 0, *or small,* 8 ; *stamens inserted on calyx, opposite to its lobes ; placentæ parietal ; ovules numerous, anatropous ; styles as many as placentæ* — Calyx-lobes equal or unequal. Stamens varying in number. Ovary open or closed at apex. Seeds numerous, minute, with little albumen.

DATISCA, L. Datisca.

Petals 0. *Staminate fl. :* — Calyx-tube short, with 4-9, unequal lobes. Stamens 9-11, anthers sessile, linear, elongated. *Fertile fl. :* — Calyx ovoid, triangular, 3-toothed at apex. Styles 3, filiform, 2-parted, divisions papillary along their inner aspect. Capsule 3-4-ribbed, oblong, apex open between styles — Herbs with aspect of Cannabis.

D. cannabina, L. ♃ 1 or more, glabrous, erect. Leaves imparipinnate, leaflets lanceolate, acuminate, coarse-serrate, the terminal often trisect, decurrent at base. Flowers in long, axillary racemes intermixed with linear, nearly entire leaves ; capsules pedicelled, pendulous — Summer — Moist places; Lebanon to Marash, and northward.

Order XLVII. CACTACEÆ, D.C. (Cactus Family.)

Fleshy, usually leafless plants, with globular, columnar and many-angled, or flattened and jointed stems, usually with prickles. Flowers solitary, sessile ; sepals adherent to the 1*-celled ovary, numerous, imbricated in several rows,*

gradually assuming the aspect of petals ; petals numerous, inserted on the calyx, showy — Stamens numerous, with long, slender filaments, inserted on the inside of the tube or cup formed by the union of the calyx-lobes and petals. Style 1 ; stigmas numerous. Fruit a 1-celled berry, with numerous campylopterous seeds on several parietal placentæ. Albumen little or none.

OPUNTIA, Tourn. PRICKLY PEAR. *Ṣubbeir.*

Sepals leaf-like; tube above ovary 0. Petals obovate, spreading. Stamens shorter than petals. Style cylindrical, constricted at base. Stigmas numerous, fleshy. Berry ovate, umbilicate at apex, tubercled, usually prickly — Shrubs with terete trunk, flattened, ovoid or oblong branches, and quincuncial tufts of barbed prickles and simple thorns, arranged spirally. Flowers arising from tufts or margins. Stamens somewhat irritable to the touch.

1. O. Ficus-Indica, Haw. ♄ Indian Fig, *Ṣubbeir.* Joints ovate-oblong, .4 to .5 long, obtuse at both ends. *Spines* .02 to .04 long, *slender.* Flowers yellow. Fruit .1 long, ellipsoidal-truncate, edible — Summer — In hedges ; everywhere to 1200 m. One of the most characteristic features of the landscape.

2. O. cochinillifera, Mill. ♄ Joints ovate-oblong, .4 to .5 long, *nearly unarmed.* Spines slender, blackish, Flowers *reddish.* Fruit crimson — Summer — About Nablûs ; cultivated for the cochineal bug, which is called in Arabic *dûdi.*

ORDER XLVIII. **FICOIDEÆ,** Juss. (FIG-MARIGOLD FAMILY.)

Fleshy herbs, with regular, hermaphrodite flowers ; petals ∞ , *inserted on calyx-tube, or* 0 ; *stamens* ∞ , *perigynous, inserted on calyx-tube ; ovary coherent to calyx-tube, or free, enclosed in it, many- or* 1-2-*celled, ovules* ∞ *or solitary, inserted on placentæ adnate to central angle, amphitropous; capsule corky or woody, loculicidal at apex or circumscissile; embryo curved or annular, surrounding the albumen.*

* *Calyx-tube adherent to ovary. Petals linear.*

1. MESEMBRYANTHEMUM, L. MESEMBRYANTHEMUM. *Ghassûl.*

Calyx-limb 5-parted. Capsule nearly pentagonal, 5-celled, the apex depressed, and opening by a star-shaped split — (Ours) Annual herbs with dichotomous branches, and white flowers.

1. M. crystallinum, L. ⊙ ② Ice Plant. *Ghassûl.* Procumbent, *densely covered with pellucid vesicles, which glisten in the sun like particles of glass.* Leaves alternate, flat, *obovate, wavy,* the radical broader, petioled, opposite. Flowers nearly sessile ; calyx-lobes ovate, unequal in breadth ; petals longer than calyx — May and June — Sandy places near coast ; Ashkelon, and southward.

2. M. nodiflorum, L. ⊙ *Ghassûl.* Procumbent or ascending, papillose. Leaves opposite and alternate, *linear*, *semi-terete*, obtuse, ciliate at base. Flowers nearly sessile ; calyx-lobes linear, unequal ; petals shorter than calyx — Spring — Sandy places, and hot, stony fields near coast, at Palmyra, about the Dead Sea, Mount Carmel, and southward.

3. M. Forskahlei, Hochst. ⊙ *Semeḥ. Samḥ.* Papillose; branches short, *very fleshy.* Leaves opposite, *short*, fleshy, terete-conical, the upper decurrent. Flowers peduncled; calyx-lobes conical, unequal ; petals longer than calyx — Spring — Sandy places ; south of Dead Sea.

* * *Calyx-tube not adherent to ovary. Petals* 0.

2. AIZOON, L. Aizoon. *Ghassûl.*

Calyx-tube turbinate or hemispherical. Stamens in clusters, alternate with the calyx-lobes. Capsules surrounded by the persistent calyx, 5-celled, opening loculicidally by a star-shaped, 5-limbed fissure at apex — Monocarpic or perennial herbs.

1. A. Hispanicum, L. ⊙ *Ghassûl. Yashenîd. Erect or ascending*, *succulent*, papillose, dichotomously branched. Leaves *opposite*, *oblong-lanceolate*, sessile, obtuse. Flowers somewhat pedicelled, solitary in the forks ; calyx-tube top-shaped, with elongated, lanceolate lobes, .015 long, white within — Early Spring — Sinai, Dead Sea, Palmyra, Aleppo, and northward and eastward.

2. A. Canariense, L. ⊙ ♃ *Kushât-el-Belâd. Ḥadaq.* Papillose-villous; stems *procumbent*, *rather woody*, *zigzag*, alternately branched. Leaves *alternate*, *obovate-spathulate*, *cuneate at base*, *tapering into a petiole.* Flowers .003 broad, sessile in axils and *along the branches;* calyx-tube hemispherical, lobes broad, short triangular-ovate, .001 long, pale within — Spring — Wadis around the Dead Sea, and southward.

3. TRIANTHEMA, L. Trianthema.

Calyx-tube campanulate. Stamens 5-10 or ∞, solitary or clustered, inserted between the calyx-lobes. Ovary 1-2-celled ; styles 1-2. The upper part of the capsule coriaceous, separating as a lid from the lower, membranous portion — Prostrate, fleshy herbs, with opposite, petioled, somewhat unequal leaves.

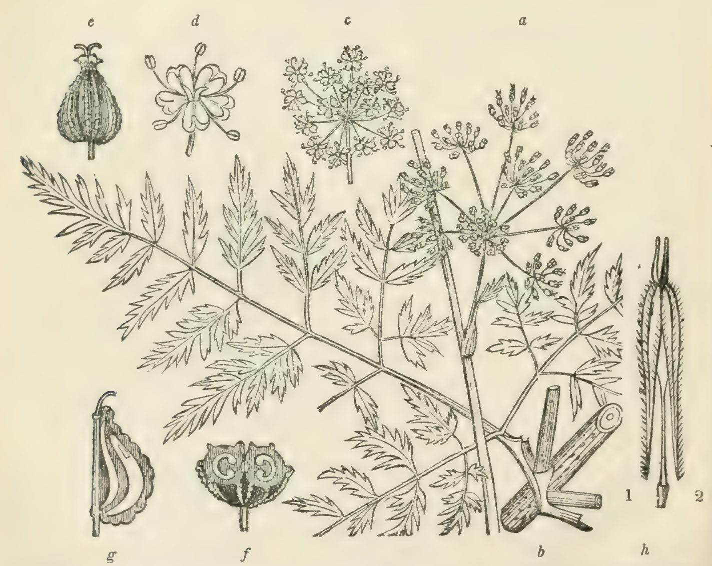
T. pentandrum, L. ♃ Pustular; stems prostrate, more or less zigzag. Leaves obovate, petiole membranous-winged on both sides at base. Flowers minute, subsessile, clustered at axils; bracteoles 2, scarious; calyx-lobes ovate with membranous margins, and hooded apex ; stamens 5; styles 2; capsules 2-celled — Spring — Ghor-es-Safieh.

Order XLIX. UMBELLIFERÆ, Juss. (Parsley Family.)

Herbs with flowers in umbels, the calyx entirely adherent to the ovary, the 5 *petals and* 5 *stamens inserted alternately on the disk that crowns the ovary, and surrounds the base of the* 2 *styles. Fruit (except in Lagœcia) composed of* 2, *seed-like, dry,* 1-*seeded mericarps; seed anatropous, with a minute embryo in horny albumen* — Flowers hermaphrodite,

polygamous-diœcious, or diœcious, regular, or with the outer petals radiating, irregular. Calyx-limb obsolete, or merely a 5-toothed border. Petals with tips mostly inflexed. Styles arising from a conical base called the *stylopodium*. Mericarps cohering by their inner face (the *commissure* or *raphe*), when ripe separating from each other, and usually suspended from the summit of a slender prolongation of the axis (the *carpophore*), each carpel marked lengthwise by five *primary ribs*, and in the *interstices* or *intervals* between them often by five *secondary ribs;* in the interstices are lodged the *vittæ* (oil tubes), which contain the aromatic oil of the plant. (They are best seen in slices across the mericarp) — Stems commonly hollow. Leaves alternate, mostly compound, the petioles expanding or sheathing at base. Umbels mostly compound, the secondary ones being called *umbellets ;* the whorl of bracts at the base of the umbels is called the *involucre*, and that beneath the umbellets the *involucel* — A large and difficult family, some of the plants innocent and aromatic, others medicinal, and others acrid and narcotic, highly poisonous.

FIG. 163.



(*a*) Compound umbel of Conium maculatum, in fruit. (*b*) A portion of its mottled stem and its 3-pinnatisect leaf. (*c*) An umbellet in flower. (*d*) A single flower, magnified (*e*) A ripe fruit, showing the stylopodium, and styles, and ribs. (*f*) A transverse section of the same. (*g*) A longitudinal section of mericarp showing the embryo in the albumen. (*h*) Fruit of an Osmorrhiza, showing the mericarps 1, 2, separating from the carpophore. At their tip are seen the two styles.

* *Umbels simple.*

TRIBE I. **HYDROCOTYLEÆ.** Fruit flattened laterally.

TRIBE II. **SANICULEÆ.** Fruit terete or flattened laterally or dorsally.

* * *Umbels compound.*

† *Primary ribs only prominent, (except in Ammineæ, Coriandrum, Bifora and Siler). Vittæ rarely wanting in the intervals.*

‡ *Fruit (except in a few Smyrneæ) flattened laterally.*

TRIBE III. **ECHINOPHOREÆ.** The central flower of umbel fertile. The ray flowers staminate, pedicelled. The fruit enclosed in an involucre of the sterile flowers.

TRIBE IV. **SMRYNEÆ.** Fruit nearly globular, broad-ovate, oblong-linear, or twin, rarely terete or slightly flattened at back. (Secondary ribs visible in Coriandrum and Bifora). Inner surface of albumen deeply grooved, rarely concave.

TRIBE V. **AMMINEÆ.** Fruit ovate, oblong, or twin, rarely short-linear. Secondary ribs visible. Inner surface of albumen flat, rarely concave.

TRIBE VI. **SCANDICINEÆ.** Fruit linear, usually beaked, rarely oblong. Inner face of albumen grooved, rarely concave.

‡ ‡ *Fruit flattened dorsally, or more or less convex or terete.*

TRIBE VII. **SESELINEÆ.** Fruit terete or nearly so. Inner face of albumen flat or concave. Lateral ribs distinct, or united into a thickened but not dilated margin.

TRIBE VIII. **PEUCEDANEÆ.** Fruit ovate, lenticular, or oblong-elliptical, flattened. Secondary ribs 0 (except in Siler). Inner face of albumen flat or concave. Lateral ribs dilated into a wing, or broad, tumid margin.

† † *Intervals over the vittæ thickened, or furnished with secondary ribs.*

TRIBE IX. **CAUCALINEÆ.** Fruit nearly cylindrical, or flattened laterally, or dorsally. The primary and secondary ribs terminating in lobed crests, or bristles, or prickles, or rarely entire; the secondary more prominent than the primary.

TRIBE X. **LASERPITIEÆ.** Fruit nearly terete or dorsally flattened. Primary ribs filiform, rarely winged, secondary all, or only the lateral, broad-winged.

TRIBE I. HYDROCOTYLEÆ.

1. HYDROCOTYLE. WATER-PENNYWORT.

Calyx-teeth obsolete. Petals ovate, entire, acute, not incurved. Mericarps destitute of vittæ, the ribs 5, filiform, the keel and lateral ones often obsolete, the intermediate arched. Carpophore undivided — Perennial, prostrate, tender herbs, rooting at joints.

H. natans, Cyr. ♃ Glabrous. Leaves long-petioled, *round-reniform*, with narrow sinus, obtusely crenate-lobed, palmately nerved. Peduncles short, thick. Flowers 5-6, short pedicelled, capitate-umbelled; fruit torn, the mericarps obscurely ribbed — Summer — Ditches; Ḥûleh.

TRIBE II. SANICULEÆ.

* *All the flowers sessile.*

2. ERYNGIUM. The flowers hermaphrodite, in dense heads. Herbs, usually prickly.

* * *All the flowers, or at least the staminate, peduncled.*

† *The ovary 2-celled.*

3 ACTINOLEMA. The flowers enclosed in a large involucre. Ribs cristate-dentate.

4. SANICULA. The flowers enclosed in a small involucre. Fruit covered with hooked prickles.

† † *The ovary 1-celled, 1-seeded.*

5. LAGŒCIA. Heads globular, many-flowered. Fruit bristly. Leaves pinnate.

2. ERYNGIUM, L. BUTTON SNAKE-ROOT. *Shindâb.*

Flowers all hermaphrodite. Calyx-teeth 5, acute, stiff. Petals erect, connivent, notched, with a long tip bent inward. Fruit ovoid,

terete, scaly or tubercled. Ribs obsolete. Vittæ 0, or inconspicuous under primary ribs. Carpophore adnate to mericarps — Prickly herbs, with simple umbels like heads or spikes, the flowers sessile, each subtended by a bract.

* *Biennials, with sessile heads, aquatic, or growing in moist places.*

1. E. Barrelieri, Boiss. ② Stem low, dichotomously branched. Radical and lower stem-leaves membranous, oblong-lanceolate, crenate, or prickly-denticulate, *undivided*, tapering into a long petiole, the upper sessile, generally 3-parted, prickly, dentate. Leaves of involucre 12-14, subulate, triquetrous, prickly at base; paleæ entire, similar to and as long as involucre leaves, dilated at base, much longer than calyx; calyx-lobes ovate, short-mucronate — July — Marshes near the coast.

* * *Perennials, with peduncled heads, growing in dry places.*

† *Paleæ all entire.*

2. E. glomeratum, Lam. ♃ *'Ud-el-Qosm. Shindâb.* .4 to 1, rigid, erect, thyrsoid or corymbose, glaucous-green. Leaves with short, sheathing petiole, bipinnatisect into linear-lanceolate, prickly-toothed lobes, the upper recurved. Involucre-leaves 5 or less, linear, keeled, nearly entire, 3-5 times as long as .01 long head — Summer — Fields; common.

3. E. campestre, L. ♃ .5, glaucous-green, corymbose above. Leaves coriaceous, the radical ovate in outline, 3-5-palmatisect, with decurrent, pinnatisect, prickly-toothed or incised, more or less overlapping segments, the stem-leaves auricled-clasping, 2-pinnatisect, prickly-toothed. Involucre-leaves 5-7, linear to linear-lanceolate, subulate, 2-4-prickly at base, twice to twice and a half as long as .012 to .015 long head, — Summer — Ḥems to Ṅusairy Mountains, Amanus, Aintâb, and northward.

4. E. Billardieri, Laroch. ♃ .5 to .8, corymbose above; plant, except lower leaves, amethyst-colored. Root-leaves orbicular in outline, *often* .15 *to* .2 *broad*, 3-5-palmately parted, segments ovate in outline, 2-3-parted into broad, linear lobes, coarsely incised-prickly. Involucre leaves 7-9, alternating with long, needle-like prickles, linear-lanceolate, subulate, prickly below, twice to thrice as long as .015 to .02 long heads — Summer — Fields; Alpine and subalpine Lebanon and Antilebanon.

Var. **Kotschyi,** Boiss. Root-leaves more dissected, often with narrowly linear lobes; external paleæ sometimes 1-toothed at apex — Akherdagh, and northward.

5. E. Heldreichii, Boiss. ♃ *Qarṣah.* .4 to .5, pale-green below and pale-blue above, corymbose, with few heads. Root-leaves round in outline, .02 *to* .04 *broad*, 2-ternatisect, with overlapping, incised-prickly segments; stem-leaves rather larger and looser, 2-4-ternate, lobes linear-prickly. Involucre leaves 7-8, linear-lanceolate, subulate, 2-0-prickly, twice to four times as long as .01 to .014 long head, — Summer — Alpine and subalpine Lebanon and Hermon.

† † *The outer paleæ tricuspid, the inner entire.*

6. E falcatum, Laroch. ♃ .5 to .8, green, dichotomous-corymbose, few-headed. Root-leaves and lower stem-leaves membra-

nous, long-petioled, *cordate-ovate, crenate,* often .15 long, undivided or palmately 3-parted, with lanceolate, doubly serrate segments ; upper stem-leaves sessile, coriaceous, 3-6-palmatisect into lanceolate and linear, serrate-prickly, *deflexed, falcate* segments. Involucre leaves 5-6, linear-lanceolate, with prickly-point and margins, thrice as long as .01 to .014 long heads — Summer — Dry fields and hillsides ; common.

† † † *All the paleæ tricuspid.*

7. E. tricuspidatum, L. ♃ Dichotomous-corymbose. Root-leaves long-petioled, cordate-orbicular, undivided or 2-3-lobed, acutely crenate, stem-leaves sessile, palmatisect into lanceolate, prickly-serrate segments. Involucre leaves 5-6, keeled, linear-subulate, prickly for their whole length, three to four times as long as heads — Summer — (Tristram says in a " locality not noted.")

8. E. Creticum, Lam. ♃ *Qurs 'anni. Shauk-el-'arqabâni.* .3 to .5, *blue,* divaricately much branched, corymbose. Root-leaves soon withering, long-petioled, oblong in outline, bipinnatipartite, with cut-toothed, prickly segments; the stem-leaves sessile, 3-8-palmatipartite into lanceolate-linear, cut-toothed, prickly divisions. Involucre leaves 5, linear-subulate, with 2 prickles at base, and sometimes others along the margins, 3-4 times as long as the .008 long heads — Summer — Fields and rocky places ; common.

Var. **oblongum,** Post. Root-leaves undivided, cordate-oblong, doubly crenate, or dentate — Beirût.

Var. **lobatum,** Post. Root-leaves oblong, entire, or 2-3-lobed, crenate — Coast.

Var. **spinulosum,** Post. Involucre-leaves prickly to apex. Stem-leaves sub-petioled — Cœlesyria.

9. E. maritimum, L. ♃ .3 to .5, glaucous, corymbose ; root-stock stoloniferous. Leaves coriaceous, coarsely incised-prickly, the radical long-petioled, cordate-reniform, undivided or palmately lobed, the upper clasping, palmately lobed. Involucre leaves 5, *broad-rhomboid, prickly toothed or lobed,* somewhat longer than the .02 to .04 long heads; upper papillæ of the at length fungous calyx-tube, prickly; calyx-lobes tender — Summer — Sandy places along the coast.

3. ACTINOLEMA, Fenzl. ACTINOLEMA.

Flowers polygamous, the central hermaphrodite, nearly sessile, the others staminate. Calyx-limb leafy. Petals erect, connivent, oblong-lanceolate, notched at slender tip. Ribs of mericarp 5, equal, prominent, obtuse, crested-dentate at back, spongy, tubercled at sides ; vittæ 1 under each rib, large; carpophore adnate—Annual, 2-3-chotomous herbs, with simple, axillary and alar, solitary, 2-4-flowered umbels; involucre light green and white, reticulated, translucent.

A. eryngioides, Fenzl. ⊙ .2 to .4, glabrous. Lower leaves oblong, crenate or dentate, tapering to a short petiole; those of forks 2-3, narrower, prickly-serrulate, the uppermost palmately tricuspid or lobed. Leaves of involucre 5-6, unequal, oblong-elliptical, tapering at base, prickly-denticulate, longer than the green flowers, calyx-lobes obovate-cuneate, truncate at apex, the keel ending in a prickly point ;

fruit ovate-oblong — May — Rocky and clayey fields; Damascus to Aleppo, Aintâb, and northward and eastward.

4. SANICULA, L. Sanicle. Black Snake-Root.

Flowers polygamous. Calyx-teeth nearly herbaceous. Petals erect, connivent, obovate, with slender tip. Fruit ovate-globular, somewhat flattened laterally, densely covered with hooked prickles. Mericarps many-vittate; ribs obsolete. Carpophore 0 — Herbs, with few-rayed umbels, and capitate umbellets, the hermaphrodite flowers nearly sessile, the staminate pedicelled.

S. Europæa, L. ♃ .3 to .8, stem scape-like, 1-0-leaved. Root-leaves long-petioled, palmatifid or parted, with obovate-cuneate, trifid, mucronate-serrate segments; stem-leaves much smaller, 3-5-palmatipartite, with obovate to lenticular, dentate segments. Umbels usually compound. Involucel-leaves numerous, linear-aristate, shorter than head — Summer — Woods; Amanus, and northward.

5. LAGŒCIA, L. Lagœcia.

Calyx-lobes large, pectinate. Petals long, with obtuse grooved tip, notched at apex, the margins ending in two, long, straight, bristles, Stylopodium and style by abortion 1. Mericarps by abortion 1, ovoid, crowned by the calyx; the ribs filiform, hardly visible; vittæ 0; seeds nearly terete, with flat, internal surface — Annual herbs, with simple, globular, many-flowered umbels, and 1-flowered umbellets.

L. cuminoides, L. ⊙ .2 to .5, glabrous; stem erect, wavy, sparingly leafy. Leaves linear in outline, pinnatisect, with minute, sessile, ovate, alternate leaflets, cut into oblong, aristate lobes. Umbels nodding before flowering; involucre-leaves pinnatipartite into long-aristate lobes; involucel-leaves 4-5, pectinate; flower pedicelled within involucel; seed setulose — Spring — Dry fields; common everywhere.

Tribe III. ECHINOPHOREÆ.

6. ECHINOPHORA. Receptacle growing, enclosing the base of the fruit. Vittæ solitary,
7. PYCNOCYCLA. Receptacle not growing. Vittæ 2-3 in intervals.

6. ECHINOPHORA, L. Echinophora.

Calyx-teeth acute, those of ray flowers unequal, often 0. Fruit oblong-pyramidal, somewhat terete. Stylopodium conical, entire. Pericarp membranous. Ribs obsolete. Albumen hollow on its inner face — Spinescent or unarmed herbs, with white or yellowish flowers; one mericarp sometimes abortive; fruit at maturity enclosed in the indurated involucel and staminate pedicels and calyces.

E. Sibthorpiana, Guss. ♃ .4 to .5, puberulent; stem striate, corymbose many-branched. Root-leaves ovate to oblong in outline, 3-pinnatisect, segments cuneate-oblong, cleft to or beyond middle into 3-7, oblong, callous-tipped teeth, the upper pinnatisect into short, 2-3-toothed lobes, or undivided. Involucre-leaves short-lanceolate, those of involucel triangular-lanceolate, at length indurated, spreading-reflexed; outer calyx-teeth of staminate flowers oblong-lanceolate, inner

minute — August and September — Dry fields after the harvest; Aintâb to Marash, and northward.

7. PYCNOCYCLA, L. Pycnocycla.

Calyx of all the flowers 5-dentate. Fruit cylindrical or oblong-subterete, surrounded by the pedicels of the sterile flowers. Pericarp membranous. Ribs obsolete. Albumen curved-involute — Shrubby perennials, with white, hirsute flowers, and hirsute fruit.

P. tomentosa, Dec. ♃ .6 to .7, glaucescent; stem striate, erect, sparingly branched. Leaves puberulent, the lowest long-petioled, limb .02 to .05 long, pinnatisect, with 2-3-pairs of .005 to .007 long, oblong, subcoriaceous, pinnatilobuled or incised, acute, entire, or denticulate lobes; upper leaves reduced to a linear sheath. Umbels long-peduncled, *woolly*, with many short rays; leaves of involucre and involucel lanceolate. reflexed, the latter unequal, pedicels of sterile flowers 9-10, as long as woolly, cylindrical-tapering fruit; calyx-teeth short-subulate — May — Rocks; Sinai; Wadi Ghurundul, near Dead Sea.

Tribe IV. SMYRNEÆ.

* *Pericarp not hard and corky, ribs filiform.*

8. ASTOMA. ♃ Fruits twin, .001 broad. Root globular. (Fig 164.)

9. CORIANDRUM. ⊙ Fruits ovate-spherical, .0025 to .003 broad; primary ribs 5, wavy, secondary 4, prominent.

10. BIFORA. ⊙ Fruits twin, .006 broad, .003 long; all the ribs inconspicuous. (Fig 165.)

11. CONIUM. ② Fruits ovate, .002 broad, with 5, prominent ribs. (Fig 163.)

12. PHYSOSPERMUM. ♃ Fruits twin, .002 broad, with 5, inconspicuous ribs. Stem tall, leafless, scape-like,

13. SMYRNIUM. ② Fruits twin, .002 to .008 broad, with inconspicuous ribs. Stem leafy to top. (Fig. 166.)

14. SMYRNIOPSIS. ② Fruits prismatic, 5-angled, with prominent ribs. Stem leafy to top.

* * *Pericarp corky, or crustaceous, or tubercled; ribs (except Cachrys), prominent.*

15. LECOKIA. ♃ Flowers white. Fruits ovate, .01 long, corky, echinate. Leaflets large, ovate. (Fig, 167.)

16. HIPPOMARATHRUM. ♃ Flowers yellow. Fruits twin, .005 long, .008 broad, crowned by a disk; ribs tubercled. (Fig. 168.) Leaves dissected into awl-shaped, or filiform lobes.

17. CACHRYS. ♃ Fruits oblong, .015 long, spongy; ribs obsolete (Fig. 169). Leaves dissected into filiform lobes.

18. PRANGOS. ♃ Fruits oblong, .01 to .02 long, spongy; ribs winged (Fig. 170.) Leaves dissected into filiform lobes.

19. COLLADONIA. ♃ Fruits oblong-club-shaped (Fig. 171). Leaflets large, oblong.

8. ASTOMA, D.C. Astoma.

Calyx-margin obsolete. Fruit flattened laterally, twin. Stylopodium disk-like, situated in the sinus between the mericarps. Mericarps globular, flattened, with indistinct, filiform ribs and intervals. Vittæ 2 in intervals. Commissure constricted. Albumen grooved on its inner face — Herbs with aspect of Bunium and Scaligeria Cretica.

A. seselifolium, D.C. .3 to .5, glabrous, with slender stem, corymbose above. Radical and lower leaves petioled, ovate in outline, .1 long, 2-3-pinnatisect, lobes oblong to linear, obtuse, decurrent ; lobes of upper leaves few, *linear*, *elongated.* Umbels 5-12-rayed ; leaves of involucre and involucel linear-setaceous — Spring — Fields ; not very common.

Fig. 164.



Fruiting umbel of A. seselifolium

9. CORIANDRUM, L. Coriander. *Kuzbarah.*

Calyx-teeth unequal. Fruit globular-ovate. Stylopodium conical, entire. Mericarps hemispherical, the primary ribs 5, wavy, the lateral remote from the margin, the secondary 4, filiform, more prominent. Dorsal vittæ obsolete, commissural 2. Internal face of albumen concave — Annual, white-flowered herbs, with slender, dichotomous stems, and a heavy smell.

1. C. sativum, L. ⊙ .4 to .5, glabrous. Leaves of *two kinds*, the lower petioled, impari-pinnatisect into 2-3 pairs of ovate-cuneiform, obtuse, incised-dentate segments, the upper short-petioled or subsessile, 2-3-*pinnatisect into linear-setaceous lobes.* Umbels 5-10-rayed, involucre 0, or composed of 1, small, setaceous bract, involucel usually of 3, short, linear-lanceolate bracts — Spring — Fields among grain ; common.

2. C. tordylioides, Boiss. ⊙ .4 to .5, glabrous. *All the leaves similar*, petioled, imparipinnatisect into 1-2 pairs of oblong-ovate, obtusely incised and dentate segments. Umbels 5-10-rayed ; involucre 0, or of 1-∞, short, membranous-margined bracts ; involucel of ∞, linear-lanceolate, membranous-margined bracts — Spring — Fields among grain ; Cœlesyria to Damascus, Aintâb, and northward.

10. BIFORA, Hoffm. Bifora.

Calyx-margin obsolete. Fruit broader than long, twin. Stylopodium minute, conical. Mericarps nearly globular, the commissural face perforated, the primary ribs 5, insconspicuous, the lateral semicircular, distant from margin the secondary also not prominent. Intervals rugose-tubercled. Vittæ 0. Seed concave on its inner surface — Annual, white flowered herbs, with a heavy odor.

B. testiculata, L. ⊙ .5, glabrous, corymbose. Lower leaves petioled, 2-pinnatisect into oblong-cuneate, incised-dentate lobes, the upper sessile, bipinnatisect into linear lobes. Umbel 2-3-rayed ; umbellet with 2-6-flowers,

Fig. 165.



Fruiting umbel of B. testiculata.

all fertile. Involucre and involucel of one, small, setaceous bract — Spring — Grain fields; common.

11. CONIUM, L. Poison Hemlock. *Shaukerân.*

Calyx-margin obsolete. Fruit ovate, laterally flattened. Mericarps with 5, equal, prominent, wavy ribs, the lateral at the margin. Intervals many-striate, vittæ 0. Stylopodia with wavy margin. Inner face of albumen grooved — White-flowered herbs, with finely dissected leaves.

C. maculatum, L. ② *Shaukerân. Seikerân.* (See Fig. 163) 1 to 2, glabrous; stem leafy, angled-striate, *spotted*, branching. Lower leaves petioled, broad-triangular, 3-pinnatisect into ovate-oblong, acute, cut-toothed segments; the upper sessile, segments oblong, cut-toothed. Umbels opposite the leaves and terminal, 10-20-rayed, bracts of involucre and involucel lanceolate-acuminate — April to June — Fields and roadsides; common. A virulent, narcotic-acrid plant, which furnished the poison by which Socrates died.

Var. **leiocarpum,** Boiss. Ribs entire.

12. PHYSOSPERMUM, Cusson. Physospermum.

Calyx-margin 5-dentate. Fruit ovate, twin, broader than long, constricted at commissure. Mericarps with 5, obtuse or somewhat prominent ribs. Intervals 1-vittate. Stylopodia conical. Inner face of albumen grooved — Perennial herbs with white flowers.

P. aquilegifolium, All. ♃ 1 or more, glabrous; stem naked, scape-like. Leaves clustered at root, long-petioled, broad-triangular, in outline, ternately tripinnatisect into cuneate-rhombic, incised-dentate segments; upper leaves reduced to a few, lanceolate bracts along the terete stem. Umbels 7-15-rayed, bracts of involucre and involucel oblong-lanceolate, short; ribs obsolescent; styles deflexed, several times longer than stylopodia — June and July — Woods; subalpine Lebanon to middle region of Cassius, Amanus, and northward.

13. SMYRNIUM, L. Smyrnium.

Calyx-teeth obsolete. Fruit twin, laterally flattened, with a narrow stylopodium. Mericarps incurved from base to apex, none of the ribs, or the dorsal only, prominent. Intervals many-vittate. Inner face of albumen grooved — Tall, perennial herbs, with various foliage, and yellow, generally polygamous flowers. Upper branches and leaves (in ours) usually opposite.

1. S. Orphanides, Boiss. ② 1 to 1.5, glabrous. Root-leaves with a sheath-like petiole, 3-ternatisect into petiolate, cordate-ovate, lobed-dentate leaflets; lower stem-leaves *ovate-subcordate*, coarsely lobed and obtusely dentate with a broad, sheath-like petiole; the uppermost sessile, *ovate-cordate*, *clasping*, *free*, crenate-dentate. Umbels 15-20-rayed; involucre and involucel 0; fruit .003 to .004 broad, ovate-globular; styles twice as long as flattened stylopodium — Spring — Lattakia; Bosrah, (Haurân).

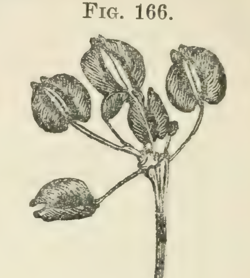
2. S. connatum, Boiss. et Ky. ② 1 to 2, glabrous. Root-leaves petioled, often .3 long, ternately pinnatisect, with ovate, subcordate, obtusely-dentate leaflets; lower stem-leaves sessile, auricled,

pinnatisect into 3-5, ovate segments, or undivided; the upper opposite, *united at base*, ovate, more or less lobed or dentate. Umbels 12-20-rayed. Involucre and involucel 0. Fruit .006 broad, *mericarps globular;* styles longer than stylopodia — Spring — Fields and rocky places; Merj 'Ayûn to Ḥaurân, Lebanon, Amanus, and northward.

Var. **alternum,** Post. Upper branches alternate. Damascus plain.

3. S. Olusatrum, L. ② 1 to 2, glabrous. Lower leaves 2-3-ternatisect into ovate, crenate, often 3-lobed leaflets; upper with a short, ovate, sheathing, membranous petiole, 3-sect into *ovate, crenate leaflets.* Umbel 5-15-rayed; involucre 0; involucel minute; fruit .008 long and broad, *with prominent, acute, dorsal ribs,* and style as long as stylopodium — April and May — Waste places and roadsides; common.

Fig. 166.



Umbellet of S. Olusatrum.

14. SMYRNIOPSIS, Boiss. Smyrniopsis.

Calyx-teeth obsolete. Fruit flattened laterally, stylopodia broad, flattened. Mericarps nearly straight, acutely pentagonal, with 5, prominent, acute ribs, the lateral at the margins. Intervals with 1-2-∞ vittæ. Albumen involute — Biennial or perennial herbs, with the aspect of Colladonia; flowers yellow.

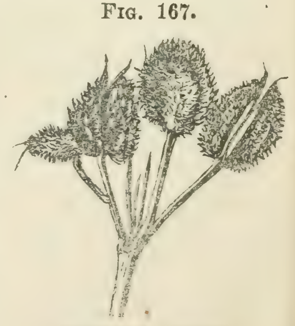
S. cachroides, Boiss. ♃ .5 to .8; stem thick, verticillate-corymbose, the plant having a hemispherical aspect, Lowest leaves oblong, entire, the others pinnatisect, with flattened petiole, and 2-3 pairs of oblong, decurrent, crenate leaflets, undivided or 2-parted; upper leaves reduced to broad, oblong petioles, bearing 3, small, ovate or oblong leaflets or 0. Rays of umbel ∞, *becoming .2 to .3 long,* pedicels 4-5 times as long as fruit; style scarcely longer than stylopodium — Spring — Haurân to Edlip, Aleppo, and eastward.

15. LECOKIA, D.C. Lecokia.

Calyx-teeth 5, short. Fruit ovoid, large, constricted at commissure. Stylopodium elongated-conical. Ribs of mericarp 5, thick, corky, muricate. Intervals obtusely grooved. Vittæ under the epicarp, numerous, adherent to seed. Inner face of albumen concave — A tall, perennial herb with fusiform root and polygamous flowers.

L. Cretica, Lam. ♃ .6 to 1, glabrous, stem terete, striate, branches somewhat whorled above. Lower leaves long-petioled; broad-triangular in outline, subternately bi-pinnatisect into oblong, acuminate, dentate leaflets, the ter-

Fig. 167.



Umbellet of L. Cretica.

minal often trifid ; petioles of upper leaves scarious-winged, short. Lateral umbels often sterile. Involucre almost 0. Bracts of involucel awl-shaped. Rays 6-12. Stylopodium tapering into a style nearly as long as the breadth of the mericarp — April and May — Open woods; principally in middle and subalpine region of mountains.

16. **HIPPOMARATHRUM,** Link. Hippomarathrum.

Calyx-teeth 5, prominent. Fruit broader than long, twin, flattened laterally, crowned with a broad, cup-shaped disk, with the minute stylopodia in the centre. Ribs of mericarp 5, thick, prominent, tubercled or crested. Pericarp crustaceous. Inner face of albumen concave, everywhere covered by numerous, slender vittæ — Perennial, much branched herbs, with yellow flowers, and leaves dissected into linear-awl-shaped, rigid lobes.

1. H. crispum, Reut. ♃ .5 to .8, *glabrescent*, stem stout, angled-striate, verticillate. Radical leaves petioled, .2 to .4 broad, those of stem sessile. *Umbels* 7-12-*rayed*, rays .02 long ; bracts of involucre and involucel lanceolate-linear, acuminate; fruit .005 long, .006 broad, beset with prominent, curved, scale-like warts — July — Nusairy Mountains, and northward.

Fig. 168.

Umbellet of H. Boissieri.

2. H. Boissieri, Reut. et Haussk. ♃ .5 to .8, sparingly hispidulous; stem striate, verticillate. Radical leaves petioled, .2 to .4 broad, those of stem smaller, sessile. Umbels 4-5-rayed, rays .015 to .025 long, bracts of involucre and involucel linear-lanceolate; fruit .005 long, .006 broad, beset with transverse, wavy, scale-like warts — Summer — Common; except in Ghor and alpine regions.

17. **CACHRYS,** L.

Calyx-teeth obsolete. Disk broad, generally with wavy margin. Fruit oblong or ovate, slightly flattened laterally, with turgid, spongy pericarp. Ribs of mericarp 5, obsolete, or somewhat prominent. Oil-tubes numerous, adherent to the seed along with the thin endocarp. Inner face of albumen deeply grooved with involute margins — Perennial herbs, with yellow flowers, and leaves dissected into linear or capillary lobes.

C. goniocarpa, Boiss. ♃ .6 to 1, glabrous; stem stout, corymbose. Leaves triangular-ovate, the lower .5 long and broad. Rays of fruiting umbel 10-15, .15 long; bracts of involucre and involucel linear-setaceous; fruit reddish, shorter than pedicel, .02 long, .015 to .018 broad, more or less obtusely pentagonal.

Fig. 169.



Fruit of C. goniocarpa.

18. PRANGOS, Lindl. PRANGOS.

Calyx-margin almost 0. Disk broad, generally with wavy margin. Fruit oblong or globular, or slightly flattened laterally, with more or less spongy pericarp. Ribs of mericarp 5, expanded into corky or membranous, flat or wavy wings, equal, or the dorsal narrower. Oil-tubes numerous, adherent to the seed along with the thin endocarp. Inner face of albumen deeply grooved, with involute margins — Perennial herbs, with yellow flowers, and leaves dissected into filiform or linear lobes.

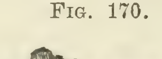
* *Outer surface of petals glabrous.*

1. P. platychlæna, Boiss. ♃ .6 to 1; stem reddish, stout. Lower leaves .6 long and broad, ovate triangular in outline, dissected into filiform, .05 to .08 long lobes. Umbels 5-20-rayed; bracts of involucre and involucel *ovate-oblong, acute, membranous;* fruit .02 long, oblong, longer than pedicel; wings straight, half as broad as diameter of seed — August — Near summit of Akherdagh, and northward.

* * *Outer surface of petals hirsute.*

2. P. asperula, Boiss. ♃ *Farsh-ed-daba'.* 1; stem angled, with opposite or verticillate branches. Leaves roughened with white papillæ, the radical triangular in outline, .5 to .6 long, dissected into .005 to .015 long, filiform lobes; those of stem with longer lobes. Umbels 10-20-rayed; bracts of involucre and involucel filiform; fruit globular, .015 in diameter, wings *wavy*, reddish, *broader than the diameter of the seed* — June — Hills and fields; Lebanon to alpine regions.

FIG. 170.





Fruit of P. asperula.

Var. **leiopetala,** Post. Petals glabrescent or glabrous — Gaza; Jebel Qulêb (Haurân).

3. P. Hermonis, ♃ Boiss. .3 to .5, crisp-puberulent; stem corymbose, much branched. Root-leaves ovate in outline, .15 to .25 long, 3-4-pinnatisect into .002 to .004 long, linear, *crowded, mucronate lobules.* Umbels 5-7-rayed; bracts of involucre and involucel *linear-lanceolate;* fruit thrice as long as pedicel, ovate, depressed at apex; wings straight, spongy at base, with triangular, transverse section, and entire, acute margins, much narrower than diameter of seed — May — Ravines on east flank of Hermon; Tel Shîhân (Leja).

19. COLLADONIA, D.C. COLLADONIA.

Calyx-teeth short or 0. Disk cup-shaped, broad. Fruit somewhat dorsally flattened, pericarp spongy. Ribs of mericarps 5, all, or the lateral only, winged or keeled, the intermediate or external often obsolete in one mericarp. Oil-tubes numerous, adherent, along with the thin endocarp, to the seed. Inner face of seed deeply grooved — Perennial, yellow-flowered herbs, with pinnate leaves, divided into large, oblong leaflets.

1. C. alata, Boiss. ♃ .5 to .8. Lower leaves entire, or pinnatisect into 1-2 pairs of ovate, obtuse, crenate leaflets, the lower usually

bipartite. Umbel with 4-10, long rays; bracts of involucre *oblong, mucronate;* fruit shorter than pedicel, elliptical-linear, *mericarps alike*, all the ribs winged to base of pericarp, the lateral as broad as the seeds, the dorsal narrower ; seed half as long as pericarp — Spring — Aintâb.

2. C. anisoptera, ♃ .6 to 1. Leaves oblong-lanceolate in outline, pinnatisect into 4-5 pairs of entire or 2-3-divided, oblong or oblong-lanceolate, crenate leaflets. Umbels with 4-10, long rays; bracts of involucre and involucel ovate-oblong, short; fruit shorter than pedicel, elliptical-club-shaped; one mericarp 3- the other 5-winged, the wings *produced to the base of the pericarp*, the lateral broader than the seed, the dorsal narrower; seed half as long as pericarp — April and May — Fields; lower and middle mountain regions.

3. C. crenata, Boiss. ♃ .6 to 1; lower leaves undivided, oblong, cordate or cuneate at base, crenate; the others ovate in outline, the largest .4 to .5 long, .3 to .4 broad, bipinnatisect into oblong, sessile leaflets, often cuneate at base, the largest .1 long, .03 broad, crenate. Umbels with 4-12-rays, .1 to .2 long in fruit; bracts of involucre and involucel lanceolate, obtuse or acuminate; fruits elliptical, .015 long, .006 broad, two-thirds to one-third as long as contracted pedicels, one mericarp 3-winged, the other 3-5-winged, the lateral wings broader than seeds, the dorsal narrower, disappearing towards base of fruit; seed half as long as pericarp — May to July — Fields, vineyards and thickets; lower and middle mountain zones throughout.

Fig. 171.



Immature umbellet of C. crenata.

4. C. microcarpa, Boiss. ♃ .6. Lower leaves ovate in outline, bipinnatisect into oblong-lanceolate, crenulate leaflets. Umbels 6-7-rayed; leaves of involucre and involucel oblong, acute; fruit two-thirds as long as pedicel, .008 to .01 long, one mericarp 3- the other 4-winged, the lateral wings as broad as the diameter of the seed; seed three-quarters as long as pericarp — April and May — Syria; place not noted (Boiss.).

Farther study may show all our species to be varieties of C. crenata.

Tribe V. AMMINEÆ.

** Petals entire, retuse, or dentate, with inflexed tip, yellow or white.*

20. BUPLEVRUM. ⊙ ♃ Leaves undivided. Flowers yellow or greenish-yellow.

21. APIUM. ② ♃ Leaves pinnate, with cuneate-lobed segments. Flowers white.

22. HELOSCIADIUM. ♃ Leaves pinnate, with ovate leaflets (Fig. 175). Aquatics, with white flowers.

23. PETROSELINUM. ⊙ Lower leaves 2-pinnate, upper 3-sect. Flowers greenish, or reddish-yellow.

24. RIDOLFIA. ♃ Leaves dissected into capillary lobes. Flowers yellow.

25. DEVERRA. ⊙ Branches stiff, interlaced, leafless. Desert herbs

** * Petals notched or 2-lobed, with strap-shaped, inflexed tip, white or yellowish.*

26. AMMI. ⊙ ② Leaves 2-3-pinnatisect, or dissected into capillary lobes, ovate or oblong. Ribs filiform.

27. CARUM. ② ♃ Root fusiform or tuberous. Leaves dissected into linear or capillary lobes. Fruits ovate or oblong. Ribs prominent.

28. SISON. ② ♃ Root-leaves 1-pinnatisect into 5-9, oblong leaflets. Stem-leaves reduced to a few sheaths, with few or 0, linear-setaceous lobes. Fruits ovate-twin, .0015 long. Ribs filiform.

29. FALCARIA. ② ♃ Lower leaves undivided or ternate. Stem-leaves ternately lobed. Fruits oblong-linear. Ribs filiform.

30. SIUM. ♃ Aquatic or marsh herbs. Leaves pinnatisect into large, oblong-lanceolate lobes. Fruits ovate or oblong. Ribs prominent.

31. BERULA. ♃ Aquatic or marsh herbs. Leaves pinnatisect into oblong lobes. Fruits ovate, somewhat twin. Ribs filiform.

32. PIMPINELLA. ⊙ ② ♃ Leaves undivided, or ternate, or pinnatisect into round, ovate, or oblong leaflets. Fruits ovate or oblong. Ribs nearly obsolete.

33. SCALIGERIA. ② Root fusiform or tuberous. Leaves pinnatisect into small, ovate leaflets, or dissected into capillary lobes. Fruits globular-twin. Ribs almost obsolete.

20. BUPLEVRUM, L. Thorough-Wax.

Calyx-teeth obsolete. Fruit laterally flattened or somewhat twin. Stylopodium flat or depressed, entire. Ribs of mericarp 5, equal, subulate, acute, or thickened, or nearly obsolete. Intervals with or without vittæ. Seed flat or concave within — Herbs or shrubs, with yellow or yellowish-green flowers, and entire leaves.

** Leaves, or at least the upper, perfoliate. Involucre* 0. *Annuals.*

1. B. croceum, Fenzl. ⊙ .3 to .5, glaucescent, divaricate-corymbose above. Lower leaves oblong, intermediate ovate, upper *orbicular, yellow.* Umbel 9-12-rayed; bracts of involucel obscurely 3-nerved, the longer as long as flowers, ovate-lanceolate, acuminate, yellow; fruit oblong, smooth, prismatic-keeled — Spring — Fields; interior plains from Aleppo to Aintâb, and northward.

2. B. protractum, Link. et Hoffm. ⊙ .3 to .5, glaucous, divaricately branched *from base.* Root-leaves tapering at base, oblong; stem-leaves oblong, the uppermost ovate. Umbels 2-5-rayed; bracts of involucel 5-7-nerved, 3-4 *times as long as flowers, ovate-orbicular,* mucronate; fruit ovate, granular in intervals — Spring — Fields; common even to subalpine regions.

Fig. 172.



Fruiting umbellet of B. protractum.

Var **latifolium,** Post. Stem-leaves large, ovate — Beirût.

3. B. heterophyllum, Link. ⊙ .05 to .1, glaucous, dichotomous from base. Root-leaves linear-lanceolate or linear, the upper clasping, auricled to perfoliate, oblong-lanceolate. Umbels 2-3-rayed; bracts of involucre ovate, abruptly acuminate, 5-7-nerved, scarcely longer than angled, granular fruit — Spring — Aleppo, Damascus, Cœlesyria, and southward and eastward.

** * Leaves linear, linear-lanceolate, or lanceolate. Involucel leaves membranous, ovate or elliptical-lanceolate, overtopping the flowers.*

4. B. Odontites, L. ⊙ *Dibbeiq.* .3 to .8; stem erect, rigid, with numerous, dichotomous branches. Leaves linear-lanceolate, acu-

minate, 5-nerved. Umbels unequally 5-rayed, the longer rays longer than involucre; bracts of involucel lanceolate, acute, twice as long as flowers, translucent, pinnate-veined, 3-nerved, the lateral nerves near the margin; pedicels unequal, longer than ovary — May and June — Fields; common, especially northward.

Var. **tenuifolium,** Post. Leaves narrowly linear — Lattakia.

Var. **condensatum,** Post. Umbels and umbellets half as large as in type, more densely clustered. Bracts of involucel lanceolate — Beirût.

5. B. nodiflorum, Sibth. ⊙ .3 to .5, 2-3-chotomously branched from base. Leaves linear-lanceolate to linear, 3-5-nerved. Umbels *head-like*, sessile, *rays* 3-6, *all shorter than involucre;* bracts of involucel ovate-lanceolate, acuminate, mucronate, *translucent, three keeled* — March to June — Fields; common to alpine regions.

6. B. brevicaule, Schlecht. ⊙ .3 to .5, 2-3-chotomously branched from base. Leaves linear-lanceolate to linear, 5-nerved. Umbels sessile, unequally 3-5-rayed, *the longer rays longer than involucre;* bracts of involucre lanceolate, acute, mucronate, *opaque, 5-nerved, not keeled* — May — Fields; Galilee to Cœlesyria, Damascus, Aleppo, and northward.

7. B. Aleppicum, Boiss. ⊙ .3 to .6, with curved, graceful, dichotomous branches. Leaves linear to linear-lanceolate, 5-7-nerved. Umbels *nodding in fruit*, unequally 3-4-rayed, the longer rays longer than involucre; bracts of involucel elliptical-lenticular, short-mucronate, *scarious, translucent, yellowish-green in flower, white in fruit,* with 5 nerves connected by anastomosing, oblique veins — May to July — Fields; Aleppo to Aintâb, and northward and eastward. A graceful and pretty species.

* * * *Leaves linear, or oblong-lanceolate.*

† *Annuals.*

‡ *Bracts of involucel 3-nerved, linear-lanceolate.*

§ *Fruit granular-muricate, with nearly obsolete ribs.*

8. B. glaucum, Rob. et Cast. .1 to .3, dichotomously branched from base. Umbels unequally 3-5-rayed, near top of branches, bracts of involucel a little longer than the flowers; fruit pedicelled, nearly globular, twin — Spring — Fields and grassy places.

§ § *Fruit smooth.*

9. B. Kurdicum, Boiss. ⊙ .3 to .5; stems stiffly dichotomous above. Umbels terminal, with 6-10, short, *nearly equal, angled* rays; bracts of involucre and involucel 5 each, the former *half as long as rays,* the latter hardly as long as flowers; fruit *a little* longer than pedicels, with *keeled ribs and deep intervals* — June — Road-sides and grassy places; Amanus to Marash, and northward and eastward.

10. B. dichotomum, Boiss. ⊙ .3 to .4, dichotomously branched. Umbels terminal, *unequally* 2-4-rayed; involucre of 1-3 bracts; bracts of involucel 3-4, *shorter* than 3-7-flowered umbellet; fruit *nearly twice as long as* pedicels, with prominent ribs — June to August — Dry places; Lebanon to 800 m.; Cassius.

11. B. Boissieri, Post. ⊙ .5 to 1, dichotomously branched from base; *smaller branches ascending or appressed.* Umbels *unequally* 2-3-rayed, *racemed along the slender branches;* bracts of involucre 1-2; bracts of involucel 4-5, barely longer than 1-5-flowered umbellet; fruit *twice* as long as pedicels, with acute ribs — August and September — Amanus, from base to 1000 m.

‡ ‡ *Bracts of involucel* 1-*nerved, linear-lanceolate to subulate.*

12. B. Gerardi, Jacq. ⊙ .3 to .6, dichotomous, *corymbose above.* Umbels terminal, unequally 5-8-rayed, the longer rays 2-3 times as long as involucre; bracts of involucre and involucel linear-subulate, the latter *once and a half* as long as the 2-7-flowered umbellets; fruit *as long as* pedicels, with filiform ribs — May and June — Rocky and sterile places; Lebanon to Damascus, Palmyra, Cassius, Amanus, Aintâb, and northward and eastward.

Var. **acuminatum,** Post. Bracts of involucel long-acuminate, twice to three times as long as umbellets — Cœlesyria; Aintâb.

13. B. Libanoticum. Boiss. et Bl. ⊙ .3 to .5, dichotomous from base; branches more or less incurved. Umbels terminal and lateral, long-peduncled, somewhat unequally 2-5-rayed; bracts of involucre 1-3, one-quarter as long as longer rays; bracts of involucel *shorter than flowering, and from one-third to as long as fruiting* umbellet; fruits rather longer than pedicels, ovate-prismatic, with *prominent ribs* — Summer — Middle and subalpine Lebanon.

FIG. 173.

Fruiting umbel of B. Libanoticum.

14. B. trichopodum, Boiss. et Sprun. ⊙ .3 to .5, slender, dichotomous; branches somewhat angled. Umbels 3-5-6-rayed, rays *capillary*, nearly equal; bracts of involucre 2, of involucel 5, subulate-setaceous, longer than flowers, as long as fruits; pedicels about as long as oblong-linear fruit; ribs acute — April and May — Northern Lebanon (Tristram).

15. B. Cappadocicum, Boiss. ⊙ .4 to 1; stem slender, with *filiform*, dichotomous, somewhat zigzag branches. *Lateral umbels* 1- *rarely* 2-6-rayed, terminal 2-3-rayed or abortive; bracts of involucre 2-3, and of involucel 5, lanceolate-setaceous, the former much shorter than rays, the latter about as long as the 2-7-flowered umbellet; fruits ovate, *longer* than pedicels, with *filiform* ribs — May and June — Dry places; Akkar to Antioch, Aleppo, Aintâb, and northward and eastward.

FIG. 174.



Fruiting umbellet of B. Antiochium.

† † *Perennials, woody at base.*

16. B. Antiochium, Post. ♃ .8 to 1; stems erect, simple below, dichotomously panicled above. Leaves flaccid, linear-lanceolate, .1 to .16 long, .005 to .018 broad, acute, 5-nerved,

tapering at base, sessile. Umbels small, nearly equally 2-3-rayed; bracts of involucre oblong, 1-2, one-third to one-fourth as long as rays, those of involucel 5, minute, oblong-ovate, shorter than 3-5-flowered umbellets; fruits oblong, longer than pedicels; *ribs winged;* intervals 3-4-vittate — September — Yokoon-Alook, near Antioch.

A plant with somewhat the aspect of B. rigidum, L., which is readily distinguished from it by its rigid, prominently nerved, oblanceolate, petioled, lower leaves, and 6-15-flowered umbellets.

17. B. linearifolium, D.C. ♃ .3 to .4, glaucescent; stems erect, paniculate. Lower leaves oblanceolate-linear, .04 to .05 long, tapering at base, upper linear. Umbels with 3, rarely 4-5, short, unequal rays; bracts of involucel oblong, 3-nerved, acute, shorter than pedicel; ribs filiform, rather prominent — Summer — Rocky and dry places.

Var. **Schimperianum,** Boiss. Ribs little prominent. Branches more spreading — Sinai.

Var. **bracteatum,** Post. Bracts of involucel much longer than pedicels. Ribs prominent — Gesbel-Dagh (Amanus).

18. B. irregulare, Boiss. et Ky. ♃ .2 to 1; stem dichotomous, narrowly paniculate above. Root-leaves oblanceolate-linear, stem-leaves few, linear. Umbels small, unequally 2-4-rayed; bracts of involucel triangular, acute, minute, shorter than pedicel; fruits oblong-elliptical, longer than pedicels; ribs winged — Summer — Subalpine and alpine Lebanon. Moab ?

* * * * *Leaves oblong, tapering at base, sessile, coriaceous. Shrubby perennials.*

19. B. fruticosum, L. ♄ .5 to .8; branches terete, rigid. Leaves .05 to .07 long, .01 broad. Umbels terminal, 6-18-rayed; bracts of involucre and involucel small, reflexed, soon falling; fruits oblong, .005 long, longer than pedicel, ribs prominent, acute; vittæ 1 in each interval — July — Rocks; Kesrowan.

21. APIUM, L. Celery. *Kurfus.*

Calyx-teeth obsolete. Fruit nearly globular, twin. Ribs of mericarps 5, filiform, equal, the lateral at margin. Stylopodium flattened. Intervals 1-vittate. Carpophore undivided. Inner face of albumen flattish — Biennial or perennial herbs, with white flowers.

A. graveolens, L. ② Celery. *Kurfus* (vulgo *Krefs.*) .5 to .8, glabrous; root spindle-shaped; stem hollow, deeply grooved. Leaves somewhat fleshy, the lower petioled, pinnatisect into 5, cuneate, incised-lobed segments, toothed at apex. Umbels short-peduncled or sessile — Spring — Marshy places and ditches; common.

22. HELOSCIADIUM, Koch. Helosciadium.

Calyx-teeth obsolete. Fruit ovate or oblong, flattened laterally. Ribs of mericarps 5, filiform, prominent, equal, the lateral at margin. Stylopodium flattened. Intervals 1-vittate. Carpophore undivided. Inner face of albumen flattened — Perennial, aquatic herbs, with white flowers.

H. nodiflorum, L. ♃ *Qurrah. Jezar-'Afârît.* .1 to .5, glabrous, rooting at lower part of stems. Leaves pinnate, consisting of 3-6 pairs of ovate-lanceolate, serrate leaflets, with oblique base. Umbels opposite the leaves, sessile or short-peduncled; bracts of involucre lanceolate, scarious-margined; fruit ovate, .0015 to .002 long, with prominent ribs --Summer — In water; common.

Fig. 175.



Fruiting umbel and leaves of H. nodiflorum.

23. PETROSELINUM, Hoffm. Parsley. *Buqdûnis.*

Calyx-teeth obsolete. Fruit ovate, laterally compressed, nearly twin. Ribs of mericarps 5, filiform, equal, the lateral at margin. Stylopodium short-conical. Intervals with 1 oil-tube. Carpophore 2-parted. Inner face of albumen flat — Monocarpic herbs, with yellowish-green or reddish flowers.

P. sativum, L. Parsley. *Buqdunis.* ⊙ Glabrous; stem erect, branching. Leaves triangular in outline, the lower 2-pinnatisect into ovate-cuneate, incised-dentate segments, the upper trisect into lanceolate-linear, entire leaflets, or entire, linear. Umbels peduncled, with numerous, equal rays — Summer — Cultivated, and escaped from cultivation.

24. RIDOLFIA, Moris. Ridolfia.

Calyx-teeth obsolete. Fruit oblong-linear, laterally flattened, crowned with a disk composed of the flattened stylopodia. Ribs of mericarps 5, nearly obsolete. Intervals with 1 oil-tube. Inner face of albumen rather concave — Annual herbs, with yellow flowers, and leaves dissected into filiform lobes.

Fig. 176.



Fruiting umbellet of R. segetum.

R. segetum, Mor. ⊙ .5 to 1, glabrous, glaucescent; stem branching, leafy. Leaves ovate in outline; lobes of lower leaves linear, short, of upper long, filiform. Rays of umbel numerous, unequal; involucre and involucel 0; outer pedicels recurved, 4-5-times as long as erect fruit — March to June — Grain fields; coast plains; common.

25. DEVERRA, D.C. Deverra.

Calyx-teeth obsolete. Fruit ovate or orbicular, laterally flattened. Ribs of mericarps filiform, nearly obsolete. Stylopodia conical, with somewhat wavy margin. Intervals with one oil-tube. Carpophore 2-parted. Seed nearly terete — Much branched, rigid, perennial, desert herbs, with whitish, leafless stems, and white or yellowish-green petals.

1. D. tortuosa, Desf. *Soqûkh. Qasîkh. Shebet-el-Jebel.* ♃ .4 to .6, glabrous, dichotomously branched from base. Root-leaves and lower stem-leaves rounded in outline, bipinnatisect into linear-subulate, rigid, divergent lobes; the upper reduced to oblong sheaths. Umbels with 6-8 rays, .015 to .02 long; *persistent* bracts of involucre oblong-ovate, and of involucel ovate, membranous-margined, shorter than pedicels; fruits shorter than pedicel, sparingly hirtulous — Spring — Borders of the lesser desert, and southward.

FIG. 177.



Fruiting umbel of D. triradiata.

2. D. triradiata, Hochst. ♃ *Qasûkh. Qazzuh.* .4 to 1, glabrous; stems erect, juncaceous, alternately branched, loosely panicled above. Upper stem-leaves reduced to short, ovate-triangular sheaths. Umbels 2-6 rayed; bracts of involucre and involucel *caducous*, the latter ovate, hooded, as long as flowers; fruits shorter than pedicel, densely long-hirsute — Spring — Sinai.

26. AMMI, L. AMMI. *Khilleh.*

Calyx-teeth obsolete or minute. Stylopodia flattened. Fruit ovate or oblong, laterally flattened. Ribs of mericarps 5, filiform, equal, the lateral at margin. Intervals with 1 oil-tube. Carpophore 2-parted. Inner face of albumen flattish — Annual or biennial herbs, with white flowers.

A. majus, L. *Khilleh-Sheitânîyah.* ⊙ .6 to 1. Leaves ovate in outline, 1-3-pinnately parted into *oblong or oblanceolate, acutely serrulate leaflets*, those of upper leaves, *or of all, linear, entire, dentate or incised.* Rays of umbel slender, .03 to .06 long in fruit; bracts of involucre with 3-5, long, filiform lobes; fruit .002 long, oblong, smooth, with slender, prominent ribs — May to July — Fields and waste places; common in lower regions.

2. A. Copticum, L. ⊙ Leaves oblong in outline, bipinnatisect into *linear-capillary, crowded lobes.* Rays of umbel .01 long, slender; bracts of involucre *short, linear, rarely trifid;* fruit .001 long, ovate, *muriculate ;* ribs *thickish,* obtuse — Spring — Fields ; Jordan Valley (Tristram).

3. A. Visnaga, L. ⊙ *Khillah. Suflin.* Leaves ovate in outline, fan-shaped, tripinnatisect into linear, divaricate lobes. Umbels dense, with *very numerous,* .04 to .06 long, *stiff* rays, spreading in flower, contracted in fruit, arising from a dilated disk; bracts of involucre long, filiform, tripartite, at length deflexed; fruiting pedicels thick; fruit .0015 to .002 long, ovate, with thick ribs — April to July—Fields, especially in clayey soil; common. The umbels of stiff, fruiting pedicels are sold as bundles of toothpicks.

27. CARUM, L. CARAWAY. *Carâwiyah. Taqrad. Taqdab.*

Calyx-margin obsolete or 5-toothed. Fruit ovate or oblong, laterally flattened. Ribs of mericarp 5, filiform, prominent, acute or thickened. Intervals with 1 or 3 oil-tubes. Carpophore forked at apex or undivided. Inner face of albumen flat — Biennial or perennial herbs, with a fusiform or tuberous root, and white or cream-colored flowers.

* *Root fusiform-cylindrical.*

1. C. polyphyllum, Boiss. et Bl. ② .5 to .6; stem stout, with alternate branches, zigzag. Leaves oblong-lanceolate in outline, petioled, 2-3-pinnatisect into linear, acute lobes. Umbels unequally 6-12-rayed; bracts of involucre 5-7 long, *setaceous;* involucel 0; fruit *club-shaped*, .005 long, .001 broad; styles 2-3 times as long as flattened, conical stylopodia — May -- Fields; Beirût; Hums.

* * *Root globular or spheroidal, more or less knobby.*

† *Intervals with one oil-tube.*

2. C. elegans, Fenzl. ♃ .4 to .6 ; stem dichotomously branched almost from base. Lower leaves long-petioled, triangular-ovate, 2-3-pinnatisect into short, linear, divergent lobes ; upper 1-2-pinnatisect into long, *linear-filiform* lobes. Umbels 5-10-rayed ; bracts of involucre and involucel short, *membranous-margined, lanceolate-subulate ;* pedicels 1-3 times as long as *obovate-truncate*, .004 long, .002 broad fruit ; styles setaceous, *wavy*, *many times* as long as depressed stylopodia — April to August — Fields to subalpine and alpine regions.

FIG. 178.



Fruiting umbellet of C. elegans.

A species with pretty flowers, .002 broad.

Var. **junceum,** Boiss. Stem slender, almost naked. Leaves reduced to few linear lobes or one. Umbels with 2-5-slender rays. Fruits smaller than in type — Hermon. Cassius.

Var **minimum,** Post. Dwarf, .05 to .1 high, almost leafless. Umbels contracted, .01 to .02 broad — Alpine regions of Jebel Ṣunnîn.

Var. **Noeanum,** Boiss. Plant more rigid. Lobes of leaves narrower. Fruit elongated, pyriform — Hermon.

3. C. brachyactis, Post. ♃ (Trans. Linn. Soc. London, 1888, p 432) .2, sparingly dichotomous almost from base, *cymose above.* Root-leaves * * * ; stem-leaves few, small, dissected into linear-spathulate lobes. Rays 7-8, nearly equal, .01 long, *a little longer than umbellets;* bracts of involucre and involucel membranous, lanceolate-subulate, shorter than rays and pedicels, or nearly as long ; pedicels slender, *shorter than* .003 long, .0015 broad fruits; style twice as long as diameter of fruit, six times as long as flattened stylopodium — June — Akherdagh.

FIG. 179.



Fruiting umbel of C. brachyactis.

4. C. nudum, Post. ♃ (Trans. Linn. Soc. London, 1888, p. 432), .5 to .6, stem terete, alternately branched above, paniculate. Root-leaves * * * ; middle stem-leaves with broad sheathing petiole, 1-pinnatisect *into 2-pairs of oblong-elliptical, acute, entire leaflets*, .014 long, .003 broad; upper leaves *reduced to a membranous. scarious-margined, abruptly caudate, sheathing petiole.* Umbels with 12-14, unequal rays, 2-3 *times as long as* the .015 long, fruiting, 15-20-flow-

ered umbellet ; involucre 0 ; bracts of involucel few, soon deciduous, short, subulate ; fruit oblong, truncate, .004 long, .0015 broad, shorter than pedicel ; styles deflexed, a little longer than the low, conical stylopodia — June — Amanus, near Beilân.

5. C. ferulæfolium, Desf. ♃ .1 to .5; stem divaricate from base, somewhat angular. Root-leaves triangular in outline, tripinnatisect into linear, obtuse lobes. Rays of umbel stout, 5-8, twice to three times as long as diameter of fruiting umbellet ; bracts of involucre and involucel few, short, lanceolate-acuminate, white-margined ; fruiting pedicels thick, stellately spreading, usually shorter than *cylindrical-prismatic*, .004 to .005 long, .001 broad, *somewhat incurved* fruits ; styles deflexed, a little longer than *truncate-cylindrical*, *cup-shaped* stylopodia — April and May — Fields ; common.

Var. **brachycarpum,** Boiss. A mountain form, with depauperated leaves, and bracts, and shorter fruits.

† † *Intervals with* 2-3 *oil-tubes.*

6. C. Pestalozzæ, Boiss. ♃ .1 to .3, divaricate from base, with wavy branches. Leaves ovate in outline, bipinnatisect into stiff, acutish, fleshy lobes, the upper reduced to few lobes, or simple. Umbels with 5-7, rather long rays ; involucre of 1, short bract, or 0 ; bracts of involucel 5-7, lanceolate, white-margined ; pedicels equalling or exceeding in length the *oblong* fruit ; ribs filiform, white ; styles deflexed, longer than flattened stylopodia — Summer — Alpine regions of Lebanon and Antilebanon.

28. SISON, L. Sison.

Calyx-margin obsolete. Fruit ovate, laterally flattened, twin. Ribs of mericarps 5, filiform, equal, the lateral at margin. Stylopodia conical, with entire margin. Oil-tubes 1 in each interval, short, broad, somewhat club-shaped. Carpophore 2-partite. Inner face of albumen flattish — Biennial herbs, with small, white flowers.

S. exaltatum, Bosss. ② 1 to 2.5 ; stem much branched, dichotomous, nearly naked. Root-leaves soon marcescent, pinnatisect into 8-10 pairs of ovate to oblong, lobed or parted leaflets, with mucronate teeth, the longest leaflets about .02 long, stem-leaves reduced to a few linear lobes, or a sheathing petiole. Umbels small, trichotomously disposed, with unequal peduncles, and 5-7, unequal rays ; bracts of involucre and involucel 5-6, lanceolate ; pedicels capillary, nearly equal, about as long as .0015 long, ovate, glabrous fruit ; styles as long as depressed stylopodia — September and October — Thickets ; mid-regions of Lebanon.

29. FALCARIA, Host. Falcaria.

Flowers polygamous. Calyx 5-toothed. Fruit oblong-linear, flattened laterally. Ribs of mericarps 5, filiform, the lateral at margin. Oil-tubes 1 in each interval. Stylopodia small, implanted on a dilated disk. Carpophore free, bifid. Inner face of albumen flattish — Glabrous, biennial or perennial herbs, with white flowers.

F. Rivini, Host. ② or ♃ .5 to 1, corymbose branched. Leaves somewhat coriaceous, the radical simple or ternate ; the middle division trifid, and the lateral 2-3-fid, with linear-lanceolate, acutely serru

late lobes. Umbels 5-15-rayed ; fruit oblong, .004 long, .001 broad — April to October — Fields ; common, especially in middle mountain zone.

30. SIUM, L. Water Parsnip.

Calyx 5-toothed. Fruit ovate or oblong, laterally flattened. Ribs of mericarp 5, the lateral at margin. Stylopodia entire, flattened-conical. Oil-tubes 3 in each interval, almost superficial. Carpophore obsolete. Inner face of albumen flat — White flowered, aquatic or marsh herbs.

S. lancifolium, M.B. ♃ 1 to 1.5 ; root fibrous, stoloniferous ; stem branching. Leaves pinnatisect into 3-5 pairs of oblong or oblong-lanceolate, acutely serrate leaflets, often .15 to .2 long, with cordate or unequally cuneate base. Umbels with 5-10, short, unequal rays ; bracts of involucre and involucel lanceolate, white-margined ; fruit oblong, .002 long, .001 broad, with prominent ribs — August and September — Wet places, Marash, and northward.

31. BERULA, M.K. Berula.

Calyx 5-toothed. Fruit ovate, laterally flattened, nearly twin. Ribs of mericarps 5, filiform, the lateral at margin. Oil-tubes numerous, deeply seated near albumen, covered by a thick pericarp. Carpophore obsolete — Aquatic, white-flowered herbs.

B. augustifolia, L. ♃ Root stoloniferous ; stem hollow, branching. Leaves pinnatisect into oblong, incised, serrate leaflets. Umbels short peduncled, opposite the leaves ; bracts of involucre large, lanceolate, *incised*, or entire — Ḥûleh.

32. PIMPINELLA, L. Pimpinella.

Calyx-teeth obsolete. Fruit laterally flattened, ovate, rarely oblong. Ribs of mericarp 5, filiform, almost obsolete. Oil-tubes 2-3, rarely 5-6 in each interval. Inner face of albumen flat — Annual, biennial, or perennial herbs, with white flowers.

Sect. I. Tragium. *Fruits pubescent or villous.*

* *Annuals, more or less divaricate from base. Umbels* 5-20-*rayed.*

1. P. Anisum, ⊙ Anise. *Yânsûn.* .5, puberulent. Lower leaves round-cordate, incised, the intermediate trisect with wedge-shaped, cut-lobed segments ; the upper sessile, divided into linear, entire or trifid lobes. Umbels with 5-12 rays, about twice as long as fruiting umbellets ; involucre and involucel with one linear bract or 0 ; petals *puberulent without ;* fruit puberulent, ovate-pyriform, .003 long, .002 broad, tapering at apex — Summer — Cultivated and escaped from cultivation.

2. P. Cretica, Poir. ⊙ .3 to .6, puberulent or glabrescent. Lower leaves *crenate-dentate*, heart-shaped, undivided, or pinnate with three, round-ovate, somewhat heart-shaped, or cuneate leaflets ; upper leaves cut into a few, oblong or linear, entire lobes. Umbels with 6-24 rays ; petals *glabrous ;* fruit *ovate-conical*, ,0015 long, .001 broad — Spring — Dry hillsides and fields ; common.

Var. **Arabica,** Boiss. .1 to .2. Lower leaves cuneate, tripartite — Sinai ; Tripoli.

3. P. puberula, D.C. ⊙ .3 to .6, tomentellous. Lower leaves cut-dentate, undivided; round or reniform, or trisect into cordate, round or cuneate leaflets, the intermediate trifid into cuneate, incised-dentate leaflets, the upper sessile, pinnatisect into linear-setaceous lobes. Umbels with 10-20 rays ; petals *pubescent without ;* fruit *round-ovate, obtuse,* .001 long and broad, hirsute — Spring — Dry places ; el-Jebel-el-Abiaḍ (Syrian Desert), to Aintâb, and northward and eastward.

4. P. eriocarpa, Russ. ⊙ .1 to .2, hairy or glabrescent. Leaves small, the lower undivided, round heart-shaped, crenate-dentate ; the intermediate pinnatipartite into 3, round to cuneate, oblong, lobed leaflets ; the upper sessile, divided into linear-setaceous, rigid lobes. Umbels with 5-7 rays ; petals glabrous ; fruit *oblong*, .002 long, .001 broad, *hispid with white hairs* — Spring — Flanks of el-Ghor to Aleppo, and eastward.

* * *Biennials.*

5. P. peregrina, L. ② 1 to 2, scabrous-pubescent, somewhat corymbose above. Lower leaves pinnatisect with 3-4 pairs of large, cuneate or cordate-ovate, dentate-lobed leaflets, the terminal trilobed ; the upper leaves dissected into cuneate-lanceolate and linear lobes. Umbels with 20-50 rays, contracted in fruit ; involucre and involucel 0 ; fruit ovate, .0015 long, hispid — May and June — Waste places ; common on lower levels.

6. P. corymbosa, L. ② .3 to .5 or .8, tomentellous-canescent ; stem stout, very leafy below, and *branched from near base, forming a dense, intricate corymb, .2 to .3 across.* Root-leaves oblong in outline, bipinnatisect into cuneate segments, with oblong, obtuse lobes ; upper leaves nearly sessile, cut into linear-cuneate lobes. Umbels 10-20-rayed ; bracts of involucre 3-5, linear, white-margined ; fruit round-ovate, .0015 long, .001 broad — Summer — Dry fields and vineyards ; Cœlesyria, Antilebanon and Damascus to Amanus, Aintâb, Marash, and northward.

Var. **Kotschyana,** Post. Fruits *hirsute* — Amanus to Aintâb, Marash, and northward and eastward. (*P. Kotschyana, Boiss.*).

* * * *Perennials.*

7. P. Tragium, Vill. ♃ .1 to .6, glaucescent or pale green, puberulent, woody at base. Root-leaves oblong in outline, pinnatisect into 2-4 pairs of somewhat coriaceous, rounded, cordate or cuneate, crenate, dentate, incised, or linear-lobuled leaflets. Rays of umbel 3-10 ; fruits ovate, .002 long, .0015 broad, puberulent — Summer — Dry places ; alpine and subalpine Lebanon.

Var. **depauperata,** Boiss. Stems almost naked, divaricate almost from base. Leaves all radical, with acutely toothed segments. Fruit ovate-oblong, short-puberulent — Alpine summits of Lebanon ; between 'Ain-Aâta and Deir-el-Aḥmar.

SECT. II. *Tragoselinum. Fruits glabrous.*

8. P. anthriscoides, Boiss. ♃ .6 to 1 ; root thick, fusiform ; stem corymbose above. Root-leaves .5 long and broad, long-petioled, triangular, bipinnatisect into oblong, obtuse leaflets, .02 to .03 long, obtusely lobed and dentate ; leaflets of stem-leaves smaller, ovate to lanceolate, incised-dentate to pinnatifid. Umbels with 12-15, nearly equal, .03 to .05 long rays ; bracts of involucre and involucel few, linear-lanceolate ; fruits ovate-oblong, .004 long, with filiform ribs — Summer — Wet places ; alpine and subalpine Lebanon and Cœlesyria to Amanus, and northward.

33. SCALIGERIA, D.C. SCALIGERIA.

Margin of calyx obsolete. Fruit laterally flattened, globular, somewhat twin. Ribs of mericarps generally obsolete ; oil-tubes 2-3 in intervals, sometimes coalesced into 1. Commissure with 2 oil-tubes. Inner face of albumen somewhat concave, 2-grooved — Biennial herbs with white flowers and minute fruits, with aspect of Pimpinella.

1. S. Cretica, Urv. ♃ or ② .6 to 1, glabrous ; root fusiform, usually simple ; stem zigzag, dichotomously branched. Root-leaves triangular in outline, somewhat ternately 2-3-pinnatipartite into *ovate*, dentate leaflets ; stem-leaves with *few*, *linear* lobes, the uppermost reduced to caudate petioles. Rays of umbel 5-10, in flower .02 to .03 long, in fruit longer, filiform ; involucre of 1, setiform bract, or 0 ; involucel of 1-3, linear bracts ; fruit .002 in diameter — May and June — Rocky places and thickets ; along coast and lower zone of mountains to 1000 m.

FIG. 180.

Fruiting umbellet of S. Cretica.

2. S. meifolia, Fenzl. ② .6 to 1, glabrous ; root fusiform, simple or 2-3 lobed ; stem leafy below, nearly naked above, paniculate, dichotomously-branched above ; branches filiform. Leaves oblong-rhombic in outline, tripinnatisect into oblong, sessile segments, which are dissected into setaceous lobes ; upper leaves reduced to sheaths. Rays of umbel 3-5, unequal, filiform ; bracts of involucre and involucel 4-5, short-lanceolate, scarious ; fruit .001 in diameter — June and July — Thickets and chalky rocks ; Cœlesyria, Antilebanon, Aintab, and northward and eastward.

3. S. capillifolia, Post. (Boiss. Supplement. Fl. Or. p. 255.) ② .6 to 1 ; root small, globular ; stem slender, loosely paniculate-branched above. Root-leaves * * ; stem-leaves ovate in outline, dissected into setaceous lobes. Umbels short, 2-4-rayed ; bracts of involucre and involucel subulate, acute, the latter nearly as long as flowers ; pedicels scarcely as long as .002 long, shining fruits — August and September — Woods and thickets ; Amanus to Akherdagh. A plant with aspect of Carum setaceum, Schrenck = Bunium capillifolium, Kar. et Kir.

FIG. 181.



Fruiting umbels of S. capillifolia.

Tribe VI. SCANDICINEÆ.

* *Calyx teeth long.*

34. GRAMMOSCIADIUM. ♃ Fruit elliptical-linear. Styles elongated.

* * *Calyx-teeth obsolete.*

35. CHÆROPHYLLUM. ② ♃ Fruit linear or oblong. Styles longer than stylopodia.

36. PHYSOCAULOS. ⊙ Fruit linear-oblong. Styles 0. Joints of stem tumid.

37. ANTHRISCUS. ② Fruit oblong to ovate-oblong, usually tapering. Styles elongated.

38. SCANDIX. ⊙ Fruit long-beaked. Styles longer than stylopodia.

34. GRAMMOSCIADIUM, D.C. Grammosciadium.

Calyx-teeth elongated, at length rigid. Fruit linear, cylindrical-prismatic, crowned by the calyx-teeth, the conical stylopodia ending in straight, divergent, tapering styles. Ribs of mericarp 5, prominent, pithy, the lateral at margin, sometimes expanded. Inner face of albumen concave — Perennial, white-flowered herbs, with dissected leaves, and many-fid bracts of involucre.

G. Haussknechtii, Boiss. ♃ .3; stem slender, sparingly corymbose above. Leaves .06 to .08 long, .003 broad, pinnatisect into minute, somewhat distant segments, dissected into very short, setaceous, mucronate lobules. Umbels 5-9-rayed; fruit short-pedicelled, elliptical-linear, .01 long, .002 broad, tapering at base and apex, the lateral ribs sometimes winged; styles shorter than thickened stylopodia — Summer — Grassy places; Ṣofdagh (Amanus).

35. CHÆROPHYLLUM, L. Chervil.

Calyx-teeth obsolete. Fruit laterally flattened, linear, rarely oblong. Ribs of mericarp 5, obtuse, equal, the lateral at margin, the intervals groove-like, with 1 oil-tube. Styles elongated. Carpophore bifid or bipartite. Albumen deeply grooved along inner face — Biennial or perennial herbs, with white or yellowish flowers, sometimes polygamous.

* *Biennials.*

1. C. Syriacum, Hempr. et Ehr. ② .3, corymbose above, minutely white-bristly, root tuberous. Leaves oblong-lanceolate in outline, bipinnatisect into small, *ovate segments, parted into minute, ovate-oblong lobules.* Rays of umbel 7-9, long, unequal, curved; bracts of involucre and involucel ciliate, membranous-margined; fruit .013 long, hirsute, one-third as long as thickened pedicel; stylopodia depressed-conical, tapering into rigid, divergent styles, four times their length — Summer — Jisr-el-Ḥajar, Lebanon.

* * *Perennials.*

2. C. oligocarpum, Post. ♃ .5 to .7; stems *naked, junciform,* dichotomously branched. Root-leaves with dilated petiole, ternatisect into short, filiform lobes; *stem-leaves reduced to a linear or awl-shaped petiole.* Umbels short-peduncled, loosely racemed along the slender branches, with 3-4 short rays; bracts of involucre and involucel membranous, minute; umbellets 5-6-flowered, *the central flower only fertile;* fruit *club-shaped* to linear-cylindrical, *often incurved,* .015 long; styles deflexed, longer than narrow stylopodia — August — Pine woods on

eastern slope of Kai-Pok-Dagh, Amanus, just below the summit.

3. C. Libanoticum, Boiss. et Ky. ♃ .5 to 1; stem stout, erect, branching above. Leaves *biternatisect into oblong*, .06 *to* .08 *long*, crenate-dentate *leaflets*, the upper divided into a few, lanceolate, dentate leaflets. Umbels with 12-20 rays; bracts of involucre and involucel short, membranous, acuminate; fruits linear, .012 long; styles rigid, divergent, 3-4 times as long as conical stylopodia — September — Subalpine Lebanon and Amanus.

Fig. 182.



Fruiting umbel of C. Libanoticum.

36. PHYSOCAULOS, Tausch. Physocaulos.

Calyx-teeth obsolete. Fruit laterally compressed, linear-oblong. Ribs of mericarps 5, obtuse, the lateral at margin; intervals 1-vittate. Stigmata sessile at apex of conical stylopodia. Carpophore entire. Inner face of albumen deeply grooved — Annual herbs, with minute, white flowers.

P. nodosus, L. ⊙ .8 to 1, strigose-hirsute; stem stout, *inflated under joints*. Leaves hirsute, ternately bipinnatisect into ovate-cuneate, obtuse, incised or dentate segments. Rays of umbel 2-3, stiff; bracts of involucre 1 or 0, of involucel 5-6, all linear, acuminate; fruits .01 long, mostly longer than pedicel, *tubercled-bristly* — April and May — Rocky and shady places in middle and upper mountain zones, and interior plateaus.

Fig. 183.



Fruiting umbel of P. nodosus.

37. ANTHRISCUS, Hoffm. Anthriscus.

Calyx teeth obsolete. Fruit ovate-oblong to oblong, generally tapering at apex. Ribs of mericarps 5, prominent at apex, obsolete below. Intervals with 1, slender, generally inconspicuous oil-tube. Stylopodia conical, margined. Inner face of albumen deeply hollowed out — Perennial or monocarpic, white-flowered herbs.

1. A. nemorosa, M.B. ♃ 1; stem grooved, stout, retrorsely hairy below, corymbose above. Lower leaves large, triangular in outline, .3 to .4 broad and long, 3-4-pinnatisect into ovate-oblong, incised or toothed segments; upper gradually diminishing. Umbels 7-10-rayed;

bracts of involucre 1-3, of involucel 3-5, membranous, oblong, acuminate, ciliate ; fruit *oblong*, .01 long, *muriculate with tubercles ending in bristles* — April and May — Woods and grassy places ; middle and subalpine Lebanon (Tristram) ; Jebel Qulêb (Ḥaurân).

2. A. lamprocarpa, Boiss. ② .6 to .8 : stem striate, divaricately branched above, often inflated below joints. Leaves tender, the lower broad-ovate in outline, 2-3-pinnatisect into long, secondary petioles woolly at base, segments petiolulate, ovate-oblong, obtusely incised-dentate, glabrous except along bristly nerves of lower surface. Umbels 3-8-rayed ; involucre 0 ; bracts of involucel 5, oblong, acuminate, woolly at margin ; fruit *oblong-tapering*, *shining* .01 long, styles scarcely longer than diverging stylopodia — April and May — Open woods ; middle mountain zone, throughout.

3. A. vulgaris, Pers. ⊙ .5 ; stem weak, erect or ascending, glabrous. Leaves tender, hirtulous along nerves of lower surface, 3-pinnatisect into ovate, crowded, *minute*, mucronate lobes. Umbels short-peduncled, nearly opposite the leaves, with 3-6, slender rays ; bracts of involucel 3-4, lanceolate, ciliate ; fruits .003 long, *ovate, thickly beset with short, incurved, conical, white prickles ; beak elongated ; stigmas nearly sessile* — Spring — Eastward from Aintâb.

38. SCANDIX, L. Scandix.

Calyx-teeth obsolete. Fruit laterally compressed, long-beaked. Ribs of mericarps 5, obtuse, equal, the lateral at margin. Oil-tubes 1 in each interval, obscure. Inner face of albumen deeply hollowed out — Annual, white-flowered herbs, leaves 2-3-pinnatisect into linear-subulate or capillary lobes.

* *Beak of fruit more or less dorsally flattened.*

† *Fruits pedicelled.*

1. S. Pecten-Veneris, L. ⊙ .3 to .5. Rays 2-3, at length thickened ; bracts of involucel ovate-oblong, entire or 2-3-fid at apex ; beak 3-4 times as long as mericarps ; styles 2-3 times as long as stylopodia — Spring — Fields ; common.

Var. **brevirostris,** Boiss. Beak twice to twice and a half as long as fruit — Beirût ; Lebanon ; Antilebanon.

Var. **longistyla,** Post. Styles several times as long as stylopodia — Beirût.

Fig. 184.



Fruiting umbellet of S. Pecten-Veneris.

2. S. Iberica, M.B. ⊙ .3 to .5. Rays 5-9, elongated; bracts of involucel deflexed, oblong-linear, 2-lobed; beak thrice as long as fruit; styles 6 times as long as stylopodia — Spring — Fields; less common than the last.

† † *Fruit sessile.*

3. S. pinnatifida, Vent. ⊙ .1 to .4. Umbels simple or 2-3-rayed; bracts of involucel pinnatifid into 3-5, *setaceous lobes;* beak .02 long, twice and a half to three times as long as seed; styles very short — Spring — Fields and stony places; middle and subalpine mountain zones, especially east of the Jordan and Cœlesyria.

* * *Beak of fruit laterally flattened.*

4. S. australis, L. ⊙ .1 to .3. Umbels simple, or with 2-3, rather long rays; bracts of involucel oblong, narrowly membranous-margined, ciliate, *undivided,* or 2-dentate; *ray flowers small;* fruit hirtulous; beak twice as long as seed; styles as long as or longer than stylopodia — Spring — Fields; Lebanon; Cœlesyria.

5. S. grandiflora, L. ⊙ .2 to .4. Umbels simple or with 2-5, long, spreading rays; bracts of involucel ovate, membranous-margined, 2-toothed; *ray flowers large;* pedicels short; beak slender, nearly cylindrical, 3-4 times as long as seed; styles 3-4 times as long as stylopodia — April — Sheṭûra; Mar Sarkîs.

Var. **multifida,** Post. Bracts of involucre more or less cleft into linear-subulate lobes — Sheṭûrah.

* * * *Beak of fruit cylindrical-awl-shaped.*

6. S. Palæstina, Boiss. ⊙ .15 to .2. Rays of umbel 6-12, at length *club-shaped, spongy;* bracts of involucel linear, ciliated, bifid; petals minute, nearly equal; *central fruit of umbellet sessile, indehiscent, spongy, ovate-conical, tapering into a terete, awl-shaped beak, as long as the seed;* the peripheral fruits on thickened pedicels, laterally compressed, with a beak twice as long as seed; styles twice as long as stylopodia — Spring — Overflowed places; Galilee, Esdraelon, and Hattîn.

Tribe VII. SESELINEÆ.

* ***Petals white, notched or bilobed, with a strap-shaped, inflexed tip.***

39. ŒNANTHE. ♃ Calyx-teeth acute. Swamp or aquatic herbs.

40. SESELI. ♃ Calyx-teeth thickened. Herbs growing in alpine woods.

41. CNIDIUM. ♃ Calyx-teeth obsolete. Herbs growing in shady places.

* * ***Petals yellow, entire or somewhat retuse, with inflexed tip.***

42. FŒNICULUM. ♃ Calyx-margin tumid, entire. Lobes of leaves linear or capillary.

43. KUNDMANNIA. ♃ Calyx-teeth ovate. Leaflets ovate, .015 to .02 long.

44. CRITHMUM. ♄ Calyx-margin obsolete. Leaflets linear-lanceolate, fleshy. Maritime herbs.

39. ŒNANTHE, L. Oenanthe.

Calyx-teeth acute. Stylopodium conical. Fruits terete, oblong, top-shaped, or cylindrical, crowned with the erect style. Ribs of mericarps 5, obtuse, the lateral or all pithy. Oil-tube 1 in each interval. Inner surface of albumen flat. Carpophore 0 — Swamp or aquatic herbs, with dissected leaves, and white, polygamous, often radiating flowers.

* *All the umbels peduncled.*

† *Root-fibres filiform.*

1. Œ. angulosa, Griseb. ♃ Stem tall, angled, solid. Leaves of two sorts, the lowest tripinnatisect into cuneate-ovate, pinnatifid or parted segments, the upper pinnatisect into elongated, linear lobes. Rays of umbel 8-12, somewhat thickened in fruit; petals moderately radiating; fruiting umbellets contracted, hemispherical, somewhat convex above; *fruits scarcely* more than .002 long, the outer as long as thickened pedicel — June — Moist places; middle zone of Lebanon.

† † *Root-fibres thickened, or filiform with tuberous nodules near tips.*

2. Œ. media, Griseb. ♃ .4 to .5. Tubers sessile, oblong or cylindrical. Leaves of *one sort*, 1-2-pinnatisect into *linear* lobes, those of *upper leaves a little longer.* Rays 5-8; fruiting umbellets compact, hemispherical; fruit short-cylindrical — Spring — El-Ḥûleh; Lebanon, and northward.

3. Œ. pimpinelloides, L. ♃ .4 to .5. Root-fibres ending in ovate or nearly globular tubers. Leaves of *two sorts*, the radical bipinnatisect into *ovate-cuneate, dentate or incised lobes;* the middle and upper pinnatisect into *short-linear or long-linear lobes, or undivided, linear.* Rays 4-8; fruiting umbellets compact, *flat-topped;* fruit cylindrical — May and June — Wet fields and swamps; middle Lebanon, Lattakia, and northward. Very near Œ. angulosa, Griseb.

* * *Central umbellet sessile; marginal sterile forming an involucre. Root-fibres cylindrical, thickened.*

4. Œ. prolifera, L. ♃ .3 to .5. Leaves of *one kind* bipinnatisect into *cuneate-ovate and cuneate-obovate, crenate-dentate segments.* Hermaphrodite umbels with 5-7, *marginal, staminate, abortive umbellets, the hardened, flat, irregularly lobed rays of which form an involucre around the central, fertile, hemispherical umbellet;* fruit sessile, prismatic — Spring — Wet places; common along coast, and in central plains, and lower mountain regions to 800 m.

40. SESELI, L. Seseli.

Calyx-teeth 5, thickish. Fruit nearly terete, ovate, or oblong, styles deflexed, inserted on conical stylopodia. Ribs of mericarps 5, slightly elevated, or prominent, thick, the lateral at margin, sometimes longer. Intervals (in ours) 1-vittate. Albumen semiterete — Herbs, usually perennial; with (in ours) white flowers.

S. Libanotis, L. ♃ .8 to 1.5; stem angled, sparingly branched. Leaves 2-3-pinnatisect into oblong-ovate, obtuse or acute lobes, .003 to .005 long; umbels convex, many-rayed; bracts of involucre and involucel numerous, linear-subulate, membranous-margined, ciliate, at length deflexed; fruit ovate, .003 long, hirsute; ribs prominent, obtuse — June — Amanus (1500 m.), and northward.

41. CNIDIUM, Guss. Cnidium.

Calyx-margin obsolete. Fruit nearly terete. Ribs of mericarps 5, acute or winged, equal, the lateral at the margin. Oil-tubes 1

in each interval — Perennial herbs, with white flowers, and 2-3-pinnately dissected leaves.

C. Orientale, Boiss. ♃ .6 to 1 or more, glabrous, with ascending branches. Leaves ovate-triangular in outline, the segments cuneate-ovate, pinnatisect or -partite into linear or oblong, obtuse, entire or lobulate lobes. Umbels many-rayed ; bracts of involucre and involucel setaceous, the latter about as long as pedicels ; fruits ovate, .003 long — Summer — Thickets and woods ; middle and subalpine zones of Lebanon, Cassius, Amanus, and northward.

42. FŒNICULUM, Hoffm. Fennel. *Shumrah. Razianij.*

Calyx-margin tumid, entire. Stylopodia large, conical. Fruit oblong-terete. Ribs of mericarps 5, prominent, obtusely keeled. Oil-tube 1 in each interval — Tall, biennial, or perennial herbs, with pinnately dissected leaves, and yellow flowers.

1. F. officinale, All. ♃ Fennel. *Shumâr.* 1 or more ; stem terete, striate. Leaves dissected into *capillary lobes*, the upper reduced to a caudate petiole. Umbels 13-20-rayed — Summer — Borders of fields, and hillsides ; not uncommon,

2. F. piperitum, D.C. ♃ 1 to 2 ; stem terete, striate. Leaves 2-pinnatisect into *linear*, *rigid* lobes ; the upper reduced to a caudate petiole. Umbels 5-7-rayed — June — Dry hills ; Galilee, Lebanon, Cassius, and northward.

43. KUNDMANNIA, Scop. Kundmannia.

Calyx-teeth ovate. Stylopodia conical. Fruit terete, prismatic-cylindrical. Ribs of mericarps filiform, obtuse, equal. Oil-tubes numerous in each interval. Inner face of albumen flat — Perennial, glabrous herbs, with pinnatisect leaves and yellow flowers.

K. Syriaca, ♃ .6 ; stem erect, flexuous, branching from base. Leaves tender, triangular in outline, bipinnatisect into ovate, subsessile, serrate or 2-3-fid segments, .015 to .02 long, .005 to .01 broad. Umbels with 15-25, .02 long rays; bracts of involucel ovate-triangular, very short ; fruit * * — June and July — Fissures of rocks above Antioch.

44. CRITHMUM, L. Crithmum.

Calyx-teeth obsolete. Fruit ovoid-oblong, scarcely flattened. Mericarps semiterete, pentagonal, the lateral ribs at margin. Pericarp pithy, thick, at length separating from the endocarp, which is adnate to the semiterete seed, and everywhere covered with oil-tubes — Glabrous, maritime herbs, with a woody base, fleshy leaves, and greenish-white flowers.

C. maritimum, ♄ .3 to .4 ; stems stout. Leaves bipinnatipartite into linear-lanceolate and oblong, acute leaflets, .02 to .05 long. Umbels many rayed ; bracts of involucre and involucel lanceolate, deflexed ; fruit .005 to .006 long, .003 broad — Summer — Hanging from rocks by the sea.

Tribe VIII. PEUCEDANEÆ.

* *Margin of fruit 2-winged ; raphe narrow ; ribs equidistant.*

45. ANGELICA. ♃ Leaves 2-3-pinnatipartite into large, ovate-oblong leaflets.

* * *Margins of mericarps touching ; raphe occupying the whole commissure.*

† *Ribs, or at least the intermediate ones, nearly equidistant.*

‡ *Secondary ribs* 4.

46. SILER. ♃ Leaves 2-3-ternately divided into large, obovate or orbicular leaflets.

‡ ‡ *Secondary ribs* 0. *Margin usually not thickened.*

47. FERULA. ♃ Tall herbs with caducous involucre; leaves with filiform, or minute, oblong lobes ; the central umbel sessile or nearly so.

48. FERULAGO. ♃ Differs from Ferula in persistent involucre, peduncled central umbel, and general habit. (Figs. 185-187).

‡ ‡ ‡ *Secondary ribs* 0. *Margin usually pithy, more or less thickened.*

49. JOHRENIA. ② ♃ Stems tall, naked, and fruit elliptical, .003 to .005 in diameter, or ♃ with low, scape-like stems, and oblong fruit; margin thick, pithy. (Figs. 188-189.)

50. PEUCEDANUM. ♃ Fruit oblong-elliptical, margin flattish. (Fig 190.)

51. ANETHUM. ⊙ Fruit lenticular, .006 long, .003 broad, margin flattish; lobes of leaves filiform.

52. KRUBERA. ⊙ Fruit lenticular, .005 long, .003 broad; margin thickened; leaves finely dissected into short, oblong lobes. (Fig 191.)

53 TORDYLIUM. ⊙ Fruit round, .006 to .01 in diameter, with wrinkled, pithy margin; leaves pinnatipartite into large, ovate or oblong, more or less dentate, incised, or parted segments. (Fig 192.)

54. AINSWORTHIA. ⊙ As in last, but fruits only half as large; margin not wrinkled (Fig 193).

† † *Lateral ribs more or less distant from intermediate. Inner margin pellucid, outer (except in Pastinaca) tumid, pithy.*

55. ZOZIMIA. ② ⊙ .2 to .6 high. Leaves much dissected into minute lobes. Rays equal.

56. HERACLEUM. ② ③ ♃ .2 to .6 high. Alpine plants, with leaves 1-2-pinnatipartite into large, ovate to oblong leaflets. Rays nearly equal. (Fig. 194.)

57. SYNELCOSCIADIUM. ⊙ 1 to 2 high, strigose. Leaves pinnate with large, ovate leaflets. Umbels unequally rayed, contracted in fruit. (Fig 195).

58. MALABAILA. ② ♃ .3 to .5, pubescent; umbels with equal rays, spreading in fruit.

59. OPOPONAX. ♃ 1 to 2, nearly glabrous. Leaves 3-pinnatipartite into obovate-cuneate leaflets. Umbels equally rayed.

60. PASTINACA. ② 1 or more. Leaves pinnatisect into ovate or ovate-oblong leaflets. Rays equal. Margin of fruit not tumid.

45. ANGELICA, L. Angelica.

Calyx-margin obsolete. Fruit with lenticular mericarps, connected by a narrow, flat keel, 2-winged on each side. The three dorsal ribs filiform, elevated, the two lateral expanded into broad, membranous wings — Oil-tubes 1 in each interval — Tall, white-flowered perennials with 2-3 pinnatipartite leaves.

A. sylvestris, ♃ 1 to 2, corymbose-panicled above ; inflorescence puberulent. Leaflets ovate to oblong-ovate, acutely serrulate, .02 to .05 long ; upper leaves reduced to an inflated petiole, with few, small leaflets. Umbel 30-40-rayed ; bracts of involucre and involucel lanceolate, membranous, numerous, caducous ; mericarps ovate-orbicular ; wings broader than seed ; ribs obtuse — September — Kerhân (base of Akherdagh), and northward.

46. SILER, Scop. Siler.

Calyx 5-dentate. Mericarps somewhat convex, with 5, primary, filiform, prominent ribs, the lateral somewhat broader, and 4, secondary ribs similar to the primary. Oil-tubes solitary under the secondary ribs. Inner face of albumen concave. Stylopodia depressed-conical—Tall, glabrous herbs, with leaves like an Aquilegium, and white flowers.

S. trilobum, L. ♃ 1. Leaves glaucescent beneath, the lower long-petioled, 2-3-ternately divided into obovate-cuneate or orbicular, crenate-toothed leaflets, .02 to .04 long, the terminal 3-lobed or parted. Umbels long-peduncled, many-rayed ; involucre and involucel almost 0 ; fruit oblong-elliptical — Summer — Woods and thickets ; middle and subalpine zone of Lebanon and Cassius, to Akherdagh, and northward.

47. FERULA, L. Ferula.

Flowers polygamous. Calyx-teeth small or obsolete. Fruits surrounded by a non-inflated margin. The dorsal ribs slender, the lateral near the margin. Oil-tubes solitary, or 3-4, or numerous in intervals, slender, obscure — Perennial, paniculate or verticillate, corymbose herbs, with yellow or greenish-white flowers, decompound leaves, with linear or filiform lobes, the central umbel of the fertile branches generally sessile or short-peduncled, the lateral staminate or polygamous.

* *Oil-tube* 1 *in interval.*

† *Sheaths of stem-leaves ovate-conical or oblong-conical, clasping.*

1. F. Hermonis, Boiss. ♃ *Sallu'. Zellu'.* 1 to 1.5; branches naked at base. Leaves *glabrous*, much dissected into crowded, *linear, obtuse*, .003 to .004 long lobes ; lower leaves .4 to .5 long and broad ; stem-petioles .1 long, .03 in diameter at base, the upper similar, but smaller, with diminishing limb. Umbels 6-10-rayed, the central *sessile;* involucre 0; bracts of involucel oblong, very short; styles 3-4 times as long as cup-shaped stylopodia ; fruit oblong, .008 long, .004 broad — July — Alpine regions of Hermon and Antilebanon.

2. F. meifolia, Fenzl. ♃ 1 to 1.5, branches naked at base. Leaves *scabrous*, much dissected into crowded, *setaceous, acute*, .002 long, *muriculate* lobes ; lower leaves .3 to .5 long and broad, stem petioles .13 long, .06 in diameter at base, the upper similar but smaller, with diminishing limb. Umbels 10-18-rayed, the central *sessile ;* bracts of involucre few, deciduous ; of involucel 5-10, very short ; styles 3-4 times as long as urn-shaped stylopodia ; fruit oblong, .008 long, .004 broad — June — Subalpine region of Mt. Cassius.

† † *Sheaths of stem-leaves lanceolate, not turgid, or boat-shaped.*

3. F. Sinaica, Boiss. ♃ *Shûmar.* 1 or more, *gbabrous, glaucescent.* Leaves much dissected, *all the ribs thickened*, lobes linear, .03 to .05 long, obtuse, mucronulate, flaccid ; those of lower leaves .02 broad, of upper narrower, stem-leaves reduced gradually to a lanceolate sheath, with *short, subulate lobes.* Central umbels peduncled ; fruit * * — May — Mt. St. Catherine (Sinai), which is called from the large quantities of this species Um-Shûmar.

4. F. Blanchei, Boiss. ♃ *Abu-et-tayyib.* .3 to .5. Leaves *velvety with white papillary hairs*, the radical subternate, with tripinnatisect divisions ; lobes oblong, .002 to .005 long, entire or 2-3-fid ; stem-leaves with a boat-shaped petiole, and reduced limb, *with longer lobes.* Central umbel sessile or peduncled ; mericarps *broad-elliptical*, .015 long, *with a margin as broad as seed ;* ribs rather prominent ; oil-tubes 1 in each interval and 4 in commissure — April and May — Northern part of Syrian Desert, between Qaryetein, Bil'âs, and Palmyra.

* * *Oil-tubes* 2-3, *or by abortion* 1, *in intervals.*

5. F. communis, L. ♃ 1 to 3, glabrous. Leaves often .5 to .6 long, dissected into filiform lobes, often .02 to .03 long ; primary ribs *quaternate to decennate*, secondary *quaternate to sexennate*, the upper leaves reduced to an oblong, boat-shaped sheath with little or no limb. Central umbel nearly sessile ; fruit obovate or elliptical, .015 long, .008 broad ; margin one-third as broad as seed — Spring — Waste fields and dry hills ; common to 1000 m.

Var. **rigidula,** Post. Lobes of leaves .005 to .01 long — Jebel Siaghah (Moab).

6. F. Tingitana, L. ♃ 1 to 3, glabrous. Leaves glaucescent, lucid, quaternately divided near base, the divisions 3-pinnatisect, the segments pinnately cut into *oblong*, .002 to .004 long, .0015 broad lobes, *somewhat revolute at margin ;* upper leaves reduced to an oblong sheath. Central umbels sessile or short-peduncled ; fruit elliptical, .01 long, .005 broad ; margin *one-fourth* as broad as seed ; ribs slender, prominent — May and June — Rocky places near coast.

7. F. Bilasi, Post. ♃ 2 to 3, glabrous ; stem thick, pithy. Lower leaves .2 to .25 long and broad, triangular in outline, ternately decompound into *minute, linear lobules, with scabrous margin ;* stem-leaves borne on a moderately turgid, ovate petiole, the uppermost reduced to lanceolate sheaths. Umbels 3-9-rayed, the central nearly sessile, *rays of lateral umbels quite unequal*, of terminal nearly equal ; fruit elliptical, *somewhat inflated*, .007 long, .004 broad, margin *one-seventh* as broad as seed — June — Rocky places ; Jebel Bil'âs (Syrian Desert), between Hamath and Palmyra.

8. F. Barbeyi, Post. ♃ .6 to 1, glabrous, glaucous ; stem slender, terete. Leaves triangular in outline, .15 long, ternately 3-4-pinnatisect into minute, oblong, scabridulous lobes, those of stem with ovate, turgid petioles, the uppermost reduced to lanceolate sheaths. Umbels nearly equally 3-10-rayed, the central one short-peduncled, rays .03 long ; fruit oblong-elliptical, .01 long, .004 broad, *margin half as broad as seed ;* ribs filiform, the marginal more distant ; intervals irregularly 2-vittate — June — Rocky places ; Jebel Bil'âs (Syrian Desert), between Hamath and Palmyra.

48. FERULAGO, Koch. Ferulago.

Flowers polygamous. Calyx 5-toothed. Fruit with a thin or thickish margin. Dorsal ribs 3, filiform, prominent, sometimes winged, the lateral obsolete at margin. Oil-tubes numerous, the dorsal covered by the pericarp, and nestling in grooves of the albumen, the commissural

superficial. Perennial, often tall, yellow-flowered herbs, with variously decompound leaves — Distinguished from Ferula by the persistent involucre, the more or less long-peduncled central umbel, the numerous oil-tubes, and prominent ribs, as well as by general habit.

* *Oil-tubes nearly equal. Petioles of secondary divisions furnished with a multifid segment at the point of insertion into the primary midrib.*

† *Dorsal ribs filiform.*

1. F. pauciradiata, Boiss. et Held. ♃ 1 to 2, glabrous, glaucescent ; stem terete, nearly naked. Leaves mostly radical, triangular in outline, ternately 2-pinnatisect into ovate segments .02 long, which are dissected into oblong-linear, rigid, mucronate, .002 to .015 long lobes ; secondary petioles long. Umbels long-peduncled, 3-7-rayed, *rays shorter than diameter of fruiting umbellet ;* bracts of involucre and involucel oblong-triangular ; pedicels much shorter than fruit ; mericarps elliptical, .008 long, .003 broad, margin one-fourth as broad as seed ; *ribs not prominent* — June and July — Shady places; Aleih (Mt. Lebanon), Amanus, Cassius, Aintâb, and northward.

† † *Dorsal ribs thick, prominent or narrow-winged.*

2. F. Cassia, Boiss. ♃ .6 to 1, glabrous ; stem terete, rather slender, corymbose above. Lower leaves oblong-lanceolate in outline, 2-3-pinnatisect, *secondary or tertiary divisions linear in outline*, segments ovate, somewhat distant, .004 long, dissected into numerous, .002 long, *subulate* lobes ; upper reduced to .015 long, oblong sheaths, with few linear lobes or 0. Umbels 6-9-rayed ; bracts of involucre and involucel oblong, acute ; mericarps elliptical, .01 long, .006 broad, longer than pedicel ; margin *wavy*, *one-third* as broad as seed ; ribs narrow-winged — April to June — Woods at base of Cassius and Amanus to Marash, and northward.

3. F. Amani, Post. (Supplement. Fl. Or. Boiss. p. 264). .8 to 1.5 ; stem terete, rather slender, *leafy to base of inflorescence*, paniculate-corymbose above. Root-leaves numerous, oblong in outline, 2-3-pinnatipartite into crowded, *capillary*, .005 to .015 long lobes; *stem-leaves reduced to linear-lanceolate sheaths, from the axils of which arise small leaves, dissected into* .002 *to* .008 *long, filiform lobes.* Rays 2-7, .015 to .03 long ; bracts of involucre and involucel oblong-triangular, few ; mericarps .008 long, .005 broad, ovate, longer than pedicel ; ribs narrow-winged ; margin *half* as broad as seed — July — Woods ; middle zone of Cassius, Amanus, and Akherdagh.

FIG. 185.



Fruiting umbel of F. Amani.

4. F. Syriaca, Boiss. ♃ 1 to 2, glabrous, glaucescent ; stem nearly naked above. Lower leaves ovate-oblong in outline, 2-3-pinnatipartite, segments ovate, pinnate or fan-shaped, dissected into flat, oblong, .002 to .01 long, .002 broad lobes, with revolute margins, the primary and secondary divisions long-petiolulate. Umbels long pedun-

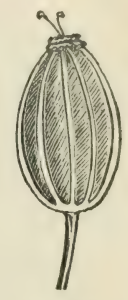
cled, with 4 to 10 rays .03 to .05 long ; bracts of involucre and involucel ovate-triangular, short ; fruit about as long as pedicels ; mericarps elliptical, .007 long, .005 broad ; ribs *thick*, margin *narrow* — June and July — Rocky places ; Judea to Lebanon, Cassius, Amanus, and northward, principally in lower and middle mountain zones.

* * *Dorsal oil-tubes* 4-7, *larger than commissural ; secondary petioles not furnished with a segment at their base.*

† *Lobes of leaves filiform, long, not easily distinguished from axis.*

5. F. Blancheana, Post. (Boiss. Fl. Or. Supplement, p. 265.) ♃ 1 to 2, glabrous, glaucescent ; stem stout, ending in a thyrsoid panicle, .4 to .5 long. Lower leaves .5 to .6 in diameter, with broad, fleshy, oblong petioles, *septennate to octonnate*, the divisions dissected in a similar manner into *filiform*, crowded lobes, .03 to .07 long ; stem-leaves 3-4-pinnately dissected into similar lobes. Rays 10-15, .02 to .03 long in fruit ; bracts of involucre and involucel oblong-triangular, large ; mericarps .008 long, .005 broad, elliptical, the 3 dorsal ribs narrow-winged, margin half as broad as seed ; dorsal oil-tubes 7-8, commissural 6 — July and August — Alpine regions of Akherdagh.

FIG. 186.



Fruit of F. Blancheana, magnified 3 diameters.

† † *Lobes of leaves oblong or linear.*

6. F. Auranitica, Post. ♃ (Journal Linn. Soc., Lond. Bot. xxiv, p. 430.) 1 to 1.3, glabrescent, glaucous ; stem terete, *leafy to base of the umbels*, corymbose above. Lower leaves ovate in outline, .5 long, 3-4-pinnately dissected into oblong-linear, .01 long lobes, with scabrous, revolute margins ; upper leaves gradually diminishing, 1-3-pinnatipartite into linear-setaceous, .005 to .015 long lobes. Umbels 12-14-rayed ; bracts of involucre and involucel filiform, numerous ; pedicels *once and a half to twice as long as fruit ;* mericarps .008 long, .005 broad ; ribs thick, *pithy ;* margin very narrow — May — Qurêyah (Haurân).

7. F. frigida, Boiss. ♃ .4 to 1 or more, glaucescent ; neck fibrous ; stem stout, sparingly paniculate above. Leaves scabrous, the lower .3 to .4 long, ovate in outline, with stiff stout ribs, 4-pinnatisect into *oblong*, .0015 to .002 long, *obtuse, fleshy lobes*, the upper 1-2-pinnatisect into fewer and longer lobes. Umbels (except the central one which is sometimes sessile) long-peduncled ; rays 8-15, more or less unequal, .02 to .04 long ; bracts of involucre and involucel *oblong-lanceolate ;* mericarps .008 long, .003 broad, elliptical ; ribs *thick*, subulate ; margin half as broad as seed — July and August — Alpine and subalpine Lebanon, Antilebanon, and Cassius.

FIG. 187



Immature fruiting umbellet of F. frigida

Var. **laxa,** Post. Stem more slender, somewhat leafy. Lobes of lower leaves .003 to .01 long, of upper .01 to .02 long. All the umbels peduncled, peduncles and rays slender — Under the Cedars of Lebanon.

8. **F. bracteata,** Boiss. et Haussk. ♃ 1 to 1.3; stem stoutish *ending in dense thyrsus, about .2 long.* Leaves minutely pubescent, greyish, the lower .3 long, ovate in outline, 4-pinnatipartite, the ultimate segments dissected into linear-oblong, acute, .002 to .003 long lobules. Branches of thyrsus opposite or whorled; rays .02 to .03 long in fruit; bracts of involucre and involucel numerous, *straw-colored*, oblong, acuminate, the latter longer than the pedicels; mericarps elliptical, .006 long, .003 broad, longer than pedicels, narrow-margined; dorsal ribs 3, *somewhat winged* — July — Calcareous rocks above Behesne (Sofdagh).

49. JOHRENIA, D.C. Johrenia.

Flowers hermaphrodite. Calyx obtusely or obsoletely 5-toothed. Fruit surrounded by a thickened, more or less pithy margin. Ribs all containing oil-tubes, the lateral near or at margin. Oil-tubes 0, or very indistinct in intervals and commisures — Biennials or perennials, with yellow flowers, and pinnatisect leaves; involvere 0 —

1. **J. selinoides,** Boiss. et Bal. ② 1 to 2; stem ending in a *broad, open panicle* Leaves triangular in outline, the lower .3 or more long, 2-3-pinnatisect into *linear-lanceolate lobes;* upper reduced to linear-acuminate sheaths. Umbels *spreading*, nearly equally 7-20-rayed; mericarps elliptical, .005 long, .003 broad, with distinct, green disk, twice as broad as pithy margin — May — Rocks, four hours south of Antioch.

2. **J. dichotoma,** D.C. ② 1; stem *dichotomously stiff-branched* above. Leaves oblong in outline, the lower 2-3-pinnatisect into *linear-lanceolate lobes;* the upper reduced to linear-lanceolate, acuminate bracts. Umbels very unequally 5-8-rayed, *contracted in fruit;* mericarps elliptical, .004 long, .003 broad, with green disk, twice as broad as pithy margin — June and July — Middle zone of Lebanon, Antilebanon, Cassius, and Amanus.

Fig. 188.



Fruiting umbel of J. dichotoma.

3. **J. fungosa,** Boiss. ② 1, stem *dichotomously stiff-branched* above. Leaves oblong in outline, the lower 2-3-pinnatisect into *narrow-linear* lobes, with somewhat revolute margins; the upper reduced to lanceolote-linear, acuminate bracts. Umbels unequally 5-7-rayed; mericarps elliptical, .003 long, convex, with *indistinct, pithy* disk — June — Mountains between Aintâb and Marash; Jebel Bil'âs, (Syrian Desert).

4. **J. Porteri,** Post. (Supplement. Fl. Or. Boiss. p. 266) ♃ 1, stem naked, stiff, dichotomous above. Leaves *all radical, oblong-lanceolate in outline*, with three and a half pairs of *remote, ovate, coarsely dentate or incised*, .02 *long leaflets. Umbels* in forks nearly sessile, with few, very short rays, the others long peduncled, with 6-12 unequal

rays, the longest .02 long, *contracted in fruit;* mericarps elliptical, .005 long, .003 broad, with flat disk, *a little broader* than pithy margin — August — Rocky hillside; Kapucham, near Marash.

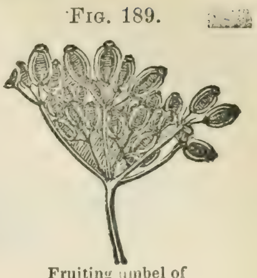


FIG. 189.

Fruiting umbel of J. Porteri.

5. J. juncea, Boiss. ♃ 1 to 3; stem naked, alternately stiff-branched above. Leaves mostly radical, .06 to .2 long, oblong in outline, bipinnatisect, the *segments* .004 *to* .008 *long, pinnatipartite into oblong-acuminate lobules,* .002 to. 003 long, with somewhat revolute margins; stem-leaves smaller, the upper reduced to linear, acuminate bracts. Umbels long-peduncled, with 6-8 unequal rays, involucel of 5-7, acuminate bracts; fruit * * — July and August — Sterile fields; between Rasheyah and the base of Hermon; southern part of Nusairy Mountains.

6. J. aurea, Boiss. et Bal. ♃ .05 to .2; root-stock woody, *branching near surface into numerous, short, tortuous, transversely striate stems,* scarcely rising above the soil, surmounted by a rosette of spreading, oblong leaves, .02 to .04 long, pinnatisect into two and a half to four and a half pairs of .005 long, round-ovate segments, dissected into .002 long, oblong, acute, simple or 2-3-fid lobes. Flowering stems .1 to .15 long, simple or bifid above; umbels with 3-4 unequal rays, the longest .015 long; bracts of involucel 5-6, linear, as long as flowers; fruits oblong, .004 long, .002 broad; disk *five times as* broad as margin — August and September — Top of Jebel Sunnîn.

50. PEUCEDANUM, L. PEUCEDANUM.

Flowers hermaphrodite. Calyx-teeth obsolete, or more or less prominent. Fruit flattened or lenticular at back, surrounded by a flattened, dilated margin. The three intermediate ribs filiform, the lateral near or at the margin. Oil-tubes solitary or 2-3 in intervals — Perennial herbs, with (in ours) yellow flowers, and involucre 0 or many-leaved.

1. P. Ruthenicum, M. B. 1 to 2; stem stout, paniculate. Leaves 3-5, *ternately divided, the primary, secondary, tertiary, and quaternary petioles long, naked,* the latter ending in linear-lanceolate to linear, rigid, simple or 2-3-fid lobes. .02 to .06 long. Umbels 5-13-rayed; bracts of involucre and involucel subulate, the former caducous; pedicel slender, about as long as fruit; mericarps *elliptical to ovate,* with margin half as broad as seed; ribs prominent — September — Middle zone of mountain north of 'Othmanîyeh (Amanus).

2. P. depauperatum, Boiss. et Bal. ♃ .6 to .8, glaucous; stems stiff, dichotomous, naked above. Root-leaves .2 long, oblong-lanceolate in outline, 1-2-pinnatisect into two and a half pairs of oblanceolate to linear-lanceolate, or cuneate-oblong, 3-5-lobed segments; upper reduced to narrow, linear-caudate bracts. Rays 2-5, unequal, *contracted in fruit,* umbels forming a *narrow, raceme-like panicle;* involucre 0; bracts of involucel minute, oblong; umbellets 3-5-flowered;

fruit *oblong-elliptical*, .01 long, .004 broad, with margin as broad as interval ; ribs filiform, prominent — Summer — Subalpine Lebanon, Antilebanon, Amanus, Akherdagh, and northward.

FIG. 190.



Fruiting umbel of P. depauperatum.

Var **alpinum**, Boiss. .1 to .3. Segments of leaves much smaller; fruits .006 long, .003 broad — Alpine regions.

Var. **ellipticum**, Post. As in var. alpinum, Boiss., but the leaflets elliptical to obovate — Berytdagh.

51. ANETHUM, L. DILL. *Shibith.*

Calyx-teeth obsolete. Fruit lenticular, surrounded by a dilated, flattened margin. Ribs filiform, the three intermediate acutely keeled, the lateral confluent with margin. Oil-tubes as broad as intervals, 1 in each — Tall herbs, with dissected leaves, and yellow flowers.

A. graveolens, L. ⊙ .3 to .5, glabrous Leaves bipinnatisect into long, setaceous lobes. Umbels many-rayed ; involucre and involucel 0 ; fruit elliptical — Spring — Plain of Sharon (Tristram).

52. KRUBERA, Hoffm. KRUBERA.

Calyx 5-toothed. Fruit lenticular. Ribs of mericarps 5, thick, prominent, the dorsal keeled, the lateral corky, transversely wrinkled, forming an elevated margin. Oil-tubes almort obsolete, under ribs. Carpophore bipartite. Inner face of albumen flat — Annuals, with minute, white flowers.

K. peregrina, L. ⊙ .3 to .4, glabrous, dichotomously branched. Leaves ovate to oblong in outline, 2-4-pinnatisect into short, linear, crowded, entire, or 2-3-fid lobes. Peduncles and rays 3-6, the latter shorter than the diameter of the fruiting umbellets ; pedicels much shorter than .005 long, .003 broad fruits — March to May — Rich fields ; coast and interior plains.

FIG. 191.



Upper leaves, and small fruiting umbel of K. peregrina.

53. TORDYLIUM, L. TORDYLIUM.

Calyx-teeth more or less conspicuous, often irregularly elongated. Fruit surrounded by a broad, thickened, wrinkled, pithy margin. Ribs slender, filiform. Oil-tubes filiform, solitary in intervals, rarely numerous — Annual, hairy herbs.

1. T. lanatum, Boiss. ⊙ .3 to .6 ; *stem and branches densely woolly.* Leaves apppressed white-woolly, *bipinnatisect*, the segments ovate-oblong, obtusely lobed and denticulate. Bracts of involucel linear-setaceous, *very short ;* marginal flowers less radiating than in the following ; fruits round, .01 in diameter, pruinose with small tubercles intermixed with larger ones ; margin moderately wrinkled — Spring — Mt. Tabor (Tristram).

* *Inner fruits of umbellets often urn-shaped, outer flat, rounded ; vittæ of dorsal intervals* 1, *of commissural* 2 ; *margin as broad as seed, the inner portion flat, pellucid, the outer thick, pithy, wrinkled.*

2. T. Ægyptiacum, L. ⊙ .3 to .4, sparingly hirsute, dichotomously branched from base. Leaves puberulent, oblong-ovate in outline, pinnatipartite into ovate segments, those *of lower leaves crenate-lobed, of upper incised-dentate.* Bracts of involucel setaceous, *somewhat shorter* than umbellet ; marginal flowers larger, radiating; fruit round, .01 in diameter, with finely tubercled and sparingly papillose disk, and glabrous, moderately wrinkled margin —Spring—Fields; common throughout, except in alpine regions and deserts.

FIG. 192.



Fruiting umbel of T. Ægyptiacum.

3. T. Syriacum, L. ⊙ .2 to .3, pubescent, sparingly branched. Lower leaves simple, the others pinnatipartite into *round-ovate to cuneate-obovate, crenate or coarse-dentate leaflets*, the terminal much larger. Bracts of involucel *oblanceolate-spathulate, much longer than umbellet ;* flowers *small, slightly radiating ;* fruit round, .01 in diameter, papillose-hairy; margin strongly wrinkled — Spring — Fields ; common.

* * *Fruits all flattened. Oil-tubes solitary in intervals.*

4. T. Hasselquistiæ, D.C. ⊙ .3 or more, pubescent, stem flexuous, branched. Lower leaves simple, the others pinnatipartite into 1-2 pairs of ovate, crenate-dentate or lobed leaflets the lower petioled. Bracts of involucre and involucel setaceous, the latter longer than umbellet ; flowers radiating ; fruits *ovate*, .006 long, *minutely tubercled at disk*, and *the whole margin* inflated and wrinkled —Spring — Fields ; Aintâb and north-eastward.

* * * *Fruits all flattened. Intervals with* 3 *oil-tubes.*

5. T. Apulum, L. ⊙ .1 to .6, soft-hairy. Leaves pinnatipartite into 3-4 pairs of ovate, crenate, incised or lobed leaflets, those of upper leaves parted into linear lobes. Bracts of involucre and involucel linear, acuminate, the latter shorter than umbellet ; flowers radiating ; fruits orbicular, .008 in diameter, *disk papillose, inner part of margin narrower than seed, pellucid*, outer pithy, strongly wrinkled — Spring — Valleys in Gilead (Tristram).

54. AINSWORTHIA, Boiss. AINSWORTHIA.

Calyx-margin obsolete. Fruit surrounded by a tumid, pithy, smooth margin. Ribs filiform, or the lateral somewhat remote. Oil-tube 1 in each interval — Strigulose or hairy annuals, with white flowers, and linear-setaceous involucre and involucel.

* *The whole margin of mericarps tumid, opaque.*

1. A. cordata, L. ⊙ .3 to .6, loosely pubescent. Leaves ovate-cordate, obtusely crenate, *undivided*, or the upper tripartite into ovate leaflets, the terminal cuneate. Involucel longer than flowers ; fruits ovate-orbicular, .004 to .006 long, the central often urn-shaped, with *glabrous margin*, as broad as minutely warty disk — Spring — Fields ; Qannubîn Valley (Lebanon).

2. A. trachycarpa, Boiss. ⊙ .3 to .6, aculeolate-scabrous. Lower leaves ovate-cordate, the others *pinnatipartite* into 3-5, ovate leaflets, the terminal much larger. Involucel longer than flowers, fruit ovate-orbicular, .003 to .004 long, with margin as broad as disk, both minutely warty — Spring — Fields ; common.

FIG. 193.



Fruiting umbellet of A. trachycarpa.

* * *The inner part of margin pellucid, the outer somewhat inflated, opaque.*

3. A. Carmeli, Boiss. ⊙ .3 to .6, hispid. Leaves obtusely crenate-dentate, either simple, cordate-ovate, or trisect. Involucel as long as or longer than flowers ; fruits orbicular, .005 to .006 in diameter, *with sparingly, warty disk* — Spring — Shrubby places ; base of Carmel.

55. ZOZIMIA, Hoffm. ZOZIMIA.

Calyx 5-toothed. Fruits with a tumid margin, the space between the seed and margin hyaline. Ribs very slender, the lateral remote, near the margin. Oil-tubes 1, occupying the whole of each interval, the commissural 2, near together — Monocarpic or perennial, pubescent or hirsute herbs, with dissected leaves and white flowers.

Z. absinthifolia, Vent. ② ③ .2 to .6, more or less greyish-pubescent; root thick, fusiform; neck densely fibrous; stems thick, often reduced to stout peduncles, springing from the root. Leaves oblong-lanceolate in outline, 2-3 pinnatisect into oblong lobules, .002 to .004 long. Umbels many-rayed ; petals not radiating, fruit orbicular to elliptical, .005 to .01 long, retuse at apex — Spring — Dry places; Sinai, Gaza, Marash, and northward, and eastward.

56. HERACLEUM, L. COW-PARSNIP.

Calyx 5-toothed. Fruit with dilated, flat margin. Ribs slender, the lateral remote, near the margin. Oil-tubes 1 in each interval, broad, generally club-shaped, short, rarely filiform — Biennial, triennial, or perennial herbs, with dilated, sheathing petioles ; flowers often polygamous.

* *Commissural oil-tubes* 2.

1. H. Amanum, Boiss. et Ky. ② ⊙ Tall. Leaves appressed-pubescent, green above, grey beneath, pinnatipartite into 2 pairs of oblong segments, which are pinnatipartite *into oblong, acute, denticulate lobes.* Inflorescence bristly pubescent; umbel *many-rayed;* fruit round-ovate, retuse, sparsely beset with small bristles — May and June — Alpine Amanus, near Spruce forests.

* * *Commissural oil-tubes* 0.

2. H. humile, S. et S. ♃ .2 to .6, papillose-pubescent; neck scaly; stems sparingly branched. Leaves oblong in outline, pinnatipartite into 2-5 pairs of ovate to cuneate-obovate, acutely dentate or incised, sometimes pinnatisect leaflets. Rays 3-6; fruit puberulent or glabrous, ovate-elliptical, .008 long — August and September — Stony places in alpine regions of Lebanon, Hermon, Berytdagh, and northward.

FIG. 194.

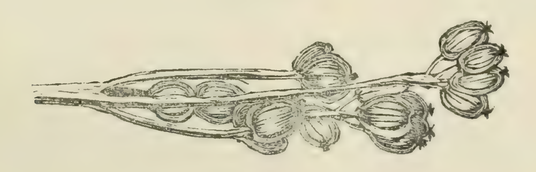


Fruiting umbellet of H. humile.

57. SYNELCOSCIADIUM, Boiss. SYNELCOSCIADIUM.

Calyx-teeth long, lanceolate, unequal, at length deciduous. Fruit with a broad, flat margin. Ribs almost obsolete, the lateral close to the margin. Styles at length indurated, erect. Oil-tubes 1 in each interval, filiform — Annual, strigose, dichotomous herbs, with white flowers, and unequally rayed umbels, contracted in fruit.

FIG. 195.



Fruiting umbel of S. Carmeli.

S. Carmeli, Lab. ⊙ 1 to 2, retrorsely hispid below. Leaves pinnate, of two and a half to four and a half pairs of large, ovate-oblong, coarse-toothed or lobed, to linear, entire leaflets. Rays 3-6; fruit round, retuse, .008 in diameter — May to July — Common along coast, and in middle zone of mountains.

58. MALABAILA, Hoffm. MALABAILA.

Calyx-margin obsolete. Fruit round or obovate; with a broad margin, translucent within, thickened and pithy without. Ribs filiform, the lateral at margin. Oil-tube 1 in each interval, the lateral at margin of seed — Perennial, yellow-flowered herbs, with non-radiating flowers.

1. M. graveolens, M. B. ② .5 to 1.5, tomentellous-canescent. Lower leaves pinnate ; leaflets three and a half pairs, oblong-ovate to oblong, sessile, crenate to coarse-dentate, the largest .03 to .04 long. Fruit obovate, retuse, .007 long, the margin broader than seed, the transparent portion broader than the opaque, tumid rim — May — Amanus to Aintâb, Marash, and northward.

Var. **bipinnata**, Post. Segments of lower leaves more or less pinnatipartite into round-ovate, crenate-dentate leaflets — Marash.

2. M. Sekakul, Russ. ♃ *Seqaqul.* .3 to .6, white-pubescent. Leaves triangular in outline, *the lower bipinnatipartite into* oblong segments, obtusely dentate or incised, decurrent at base. Fruits round or obovate, retuse, .01 in diameter, glabrous or nearly so ; margin broader than seed, the pellucid part as broad as the thickened border — Spring — Fields ; not rare.

59. OPOPONAX, Koch. Opoponax.

Calyx-margin obsolete. Fruits ovate, with dilated margin, pellucid within, tumid at border. Ribs slender, the lateral remote. Oil-tubes broad, 2-3-1 in intervals — Tall, yellow-flowered perennials.

O. Syriaca, Boiss. ♃ 1 to 2, glabrous, except a few conical papillæ at petioles and nerves of leaves ; stem verticillate, thyrsoid-paniculate above. Root-leaves ovate-triangular in outline, .4 to .6 in length, tripinnate into obovate-cuneate, crenate-dentate leaflets, lower border of leaflets decurrent ; the upper leaves small, tripartite, or cuneate-oblong, undivided. Rays 12-15, short ; bracts of involucre and involucel 3-5, linear-lanceolate, minute ; fruit elliptical, glabrous, the white, tumid margin as broad as intervals ; oil-tubes 1 in each interval, 7-8 at commissure — May and June — Subalpine Lebanon, in Ehedin forest and at Ḥadeth ; Antilebanon ; Ḥaurân. (*Smyrniopsis Syriaca, Boiss.*)

60. PASTINACA. L. Parsnip. *Isṭuflîn.*

Calyx-margin obsolete, or minutely denticulate. Fruit flattened, surrounded by a narrow, flattened margin. Ribs slender, the three intermediate equi-distant, the lateral distant, near margin. Oil-tubes 1, or rarely 2 in intervals, slender — Biennial, rarely perennial herbs, with yellow flowers.

P. teretiuscula, Boiss. ② Stem rather terete, striate. Leaves pinnate, glabrescent at upper surface, pubescent or grey-velvety at lower, leaflets large, ovate or ovate-oblong, crenate, the terminal generally tri-lobed. Fruit ovate-elliptical to elliptical, glabrous ; oil-tubes extending almost to the base of the mericarps, the commissural 2, thickish — Summer — Ḥasrûn (Lebanon).

Tribe IX. CAUCALINEÆ.

61. EXOACONTHA. ⊙ Fruit oblong, .0015 long. Eryngioid, prickly plants.

62. ARTEDIA ⊙ Fruit round, with broad, obovate-spathulate, lobed wings. (Fig. 196.)

63. ORLAYA. ⊙ Fruit oblong, .01 to .015 long ; secondary ribs with 1-3 rows of triangular-setaceous prickles. (Fig 197.)

64. DAUCUS. ⊙ ② Fruit oblong, .003 to .01 long ; secondary ribs with 1 row of subulate prickles. (Fig. 198.)

65. CHÆTOSCIADIUM. ☉ Fruits oblong, .007 long, .004 broad, all covered with long, slender bristles.

66. CUMINUM. ☉ Fruit fusiform, .005 long, .002 broad ; secondary ribs setulose.

67. TURGENIOPSIS. ☉ Fruit elliptical, .008 long ; secondary ribs broad, with 2-3 rows of tubercled bristles.

68. TORILIS. ☉ Fruit oblong, .002 to .006 long; secondary ribs concealed by numerous prickles occupying the whole interval. (Fig. 200.)

69. CAUCALIS. ☉ Fruit oblong-elliptical or linear-oblong, .003 to .012 long ; secondary ribs with 1-3 rows of prickles.

70. TURGENIA. ☉ Fruit ovate-twin, .012 long, .008 broad ; all the dorsal ribs with 2-3 rows of prickles.

71. LISÆA. ☉ Fruit ovate, .006 long; primary dorsal ribs with denticulate crests, secondary obsolete, or transmuted into a simple row of tubercles.

61. EXOACONTHA, Labill. Exoacontha.

Calyx-margin obsolete. Stylopodia cushion-like, with entire margin. Fruit somewhat laterally compressed, minute. Mericarps terete, with corky primary and secondary, entire ribs, the lateral at margin. Oil-tubes 1 in each interval, 4 at broad, flat commissure. Carpophore 0 — Annual herbs, with unequal rays, incurved and thickened in fruit, the bracts of the involucre and involucel prickly, stiff, the external of the latter much longer than the rest ; the pedicels thickened in fruit, incurved with the fruits into a dense cluster, deflexed along the inner side of the ray, and enclosed by the outer bract of the involucel so as to form an eryngioid head.

E. heterophylla, Labill. ☉ .2 to 1, branching from base. Root-leaves pinnate, with one and a half to three and a half pairs of remote, ovate to oblong, acutely dentate or incised leaflets ; stem-leaves pinnate, with 3-5, long, lanceolate-linear to linear, entire or sparingly dentate leaflets ; the upper leaves linear, entire. Inner bracts of involucel awl-shaped, one-third to one-fourth as long as linear, outer bract ; fruit .0015 long, .001 broad — April to August — Fields ; not rare.

62. ARTEDIA, L. Artedia.

Calyx-margin obsolete. Fruit round, dorsally flattened, the primary ribs and the two central secondary dorsal filiform, the lateral two expanded into broad wings, which are divided into obovate-spathulate lobes, with round sinuses. Oil-tubes 1 under each secondary rib. Inner face of mericarp netted-wrinkled — Annual herbs, with white flowers, and 2-3-pinnate leaves with capillary lobes.

Fig. 196.



Fruit of A. squamata.

A. squamata, L. ☉ .3 to .5. Involucre and involucel longer than flowers, dissected into capillary lobes; ray-flowers .01 broad, with two large petals ; seed flattened, lenticular, much narrower than wings — Spring — Fields ; common.

63. ORLAYA, Hoffm. Orlaya.

Calyx-margin 5-toothed. Fruit oblong, dorsally compressed. Primary ribs filiform, bristly, secondary keeled, with 1-3 rows of prickles of equal length, or the outer longer. Oil-tubes 1 under each

secondary rib. Inner face of albumen flat — Annual herbs, with white flowers.

1. O. grandiflora, L. ⊙ .2 to .4, glabrous or pubescent. Lower leaves oblong in outline, bipinnatisect into minute, oblong lobes. Umbels long-petioled, with 5-8, short, nearly equal rays ; bracts of involucre lanceolate, of involucel oblong, all scarious-margined ; outer petals radiating, *ten times* as long as the rest ; prickles of secondary ribs shorter than breadth of mericarp — Spring — Moab.

2. O. platycarpos, L. ⊙ .2 to .4, *glabrous or sparingly setulose.* Lower leaves oblong-ovate in outline, 2-3 pinnatisect into minute, crowded, oblong lobes. Umbels long-peduncled, with 2-3, short rays ; bracts of involucre *lanceolate,* and of involucel *ovate, membranous-margined,* the latter shorter than flowers ; outer petals radiating ; fruit crowned by calyx-teeth ; prickles of secondary ribs *usually in one row,* with triangular base and hooked *apex,* the outer twice as long as breadth of seed — Spring — Fields ; common.

Fig. 197.



Fruiting umbellet of O. platycarpos.

Var. **intermedia,** Boiss. Prickles more slender, and shorter, those of inner ribs free at base — Around Mt. Cassius.

3. O. maritima, L. ⊙ .1 to .3, *grey-velvety,* branching from neck. Leaves ovate-oblong in outline, 2-3-pinnatisect into minute, ovate-oblong, obtuse lobes. Rays unequal, 3-5 ; bracts of involucre and involucel *filiform,* or the former *dissected into filiform lobes ;* fruit elliptical, .01 long, .006 broad ; prickles in 1-2 rows, triangular at base, *barbed at tip,* usually shorter than breadth of seed — Spring — Sands along the coast.

Var. **breviaculeata,** Boiss. Prickles of fruit short.

64. DAUCUS, L. Carrot. *Jezar.*

Calyx-teeth 5, tender, sometimes 0. Fruit ovate or oblong, somewhat dorsally compressed. Primary ribs filiform, bristly, secondary equal, with a wing more or less cleft into one row of prickles. Oil-tube one under each secondary rib. Inner face of albumen flat — Monocarpic, often hispid or bristly herbs, with white or yellowish flowers.

* *Involucre* 0.

1. D. pulcherrimus, Willd. ② *Lezzâqah.* .6 to 1, erect, *stout,* stiff-branched above. Leaves glabrous, or velvety hirtulous, triangular-ovate in outline, 3-4 pinnately dissected into minute, oblong, obtuse lobes ; the upper reduced to a dilated, sheathing petiole. Rays numerous, long ; bracts of involucel oblong-lanceolate, ciliate ; fruit oblong, .01 long, .006 broad, including prickles ; prickles of secondary ribs grooved on either side at triangular base, setaceous at apex, scabrous to villous, longer than diameter of seed — Spring — Vineyards and fields ; Cœlesyria to Antilebanon, Antioch, Aintâb, and northward.

2. D. leptocarpus, Hochst. ⊙ .4 to .6; stem *slender*, stiff-branched above, retrorsely setulose. Leaves oblong-ovate in outline, 2-pinnately dissected into small, lanceolate, simple or 3-5-fid lobes. Rays 7-15, setulose; bracts of involucel linear-subulate, setulose; petals somewhat radiating; fruits .006 long, .004 broad, including prickles; prickles setaceous, scabridulous, pellucid, several times as long as diameter of linear seed — Summer — Kurd Dagh, and northward, and eastward.

* * *Involucre of many leaves.*

† *Fruiting umbel contracted, nest-like.*

‡ *Prickles often connate for one-fourth their length, barbed.*

3. D. Broteri, Ten. ⊙ .1 to .4, bristly, divaricately branched from base. Leaves oblong-lanceolate in outline, 2-pinnately dissected into minute, oblong-linear, entire or 2-3-fid lobules. Umbels small; rays .005 to .02 long; bracts of involucre linear, trifid, of involucel *linear-subulate*, simple or three-forked; fruits .006 long, .004 broad, including prickles; ribs somewhat remote; prickles longer than diameter of seed — May and June — Fields; along the coast; lower and middle zones of Lebanon.

FIG. 198.



Fruiting umbel of D. Broteri.

Var. **bicolor,** Boiss. Umbels long-peduncled. Involucre and involucel *often longer than umbellets.* Central flowers often sterile, violet — Same range as type.

‡ ‡ *Prickles short-connate at base, barbed. Leaves dissected into minute lobes.*

4. D. littoralis, S. et S. ⊙ .3 to .4, glabrous or retrorsely hairy. Leaves oblong in outline, 2-pinnatisect, segments dissected into simple or 2-3-fid, fleshy, minute, oblong lobes. Rays 7-9, rigid, .005 to .03 long; bracts of involucre linear, entire or trifid, of involucel *linear-lanceolate, with membranous margin*, bristly; fruits .006 long, .004 broad, including prickles; prickles longer than diameter of seed — Spring — Sandy places, along coast, and more sparingly in lower hill country.

Var. **genuinus,** Boiss. Prickles 10-12.

Var. **Forskahlei,** Boiss. Prickles 6-9 — Beirût; et-Tîh.

Var. **longiradiatus,** Post. Radii .01 to .05 long—Sands; Beirût.

5. D. subsessilis, Boiss ⊙ .1 to .2, asperulous; branches *short*, few, stiff, *appressed to stem* or 0. Leaves oblong-ovate in outline, 3-pinnatisect into minute, linear-filiform lobes. Umbels 1-3 in *axillary clusters* with thick peduncles, and *few* rays; bracts of involucel pinnatisect, longer than flowers; *petals small, not radiating;* fruit .005 long, .003 broad, including prickles; prickles slender, twice as long as diameter of seed — April — Stony places; near Bethany; between 'Ain Ḥesbân, and 'Ammân (Moab).

6. D. setulosus, Guss. ⊙ .3 to .6, retrorsely scabrous; stems erect and ascending. Lower leaves oblong in outline, 2-pinnati-

sect, the segments pinnately parted into short, linear-oblong, simple or bifid lobes. Umbel small, few-rayed ; bracts of involucel linear-setaceous, setulose ; petals radiating ; central flower sometimes sterile ; prickles *bristle-like*, twice as long as diameter of seed — April to July —

Var. **brachylænus,** Boiss. Involucres shorter than umbels — Coast to Amanus, Aleppo, Aintâb, Marash, and northward.

7. D. aureus, Desf. ⊙ 1 to 1.5, setulose, drying yellow ; stem somewhat corymbose. Leaves triangular-oblong in outline, much dissected into oblong and linear lobes, the secondary axes of the divisions at right angles to the primary. Umbels many-rayed ; bracts of involucre *pinnately dissected into setaceous* lobes, shorter than the rays, bracts of involucels trifid, as long as flowers ; fruit .004 long, .002 broad, including prickles ; prickles lanceolate, twice as long as diameter of seed — Spring — Fields ; Coast and hill country of Palestine and Lebanon to 800 m ; Gilead.

‡ ‡ ‡ *Base of prickles nearly free. Lobes of leaves often* .01 *or more long.*

8. D. Carota, L. ② Carrot. *Jezar.* 1 to 1.5, branching, scabrous. Leaves triangular to oblong in outline, 2-3-pinnatisect into *oblong-lanceolate, incised-dentate segments*, those of upper leaves *linear-lanceolate.* Umbel with very numerous rays, at length contracted into a nest-like form ; bracts of involucre trifid or pinnate, of involucel linear, white-margined, entire or 2-3-fid ; petals radiating ; central flower sterile, purple ; fruits .004 long, .003 broad, including prickles ; prickles setaceous, as long as diameter of seed or longer, with 1-3 *recurved barbs* — Spring and Summer — Fields and waste places ; everywhere.

Var. **glabrescens,** Post. Glabrescent — Antioch.

Var. **maximus,** Post. Tip of prickles barbed — Common. (*D. maximus, Desf.*)

9. D. Blanchei, Reut. ② 1 to 1.5, retrorse-hispid below, scabrous above. Leaves triangular-lanceolate in outline, bipinnatipartite into *somewhat rhombic*, incised to pinnatipartite segments, lobes of upper leaves lanceolate to linear. Rays of umbel *unequal*, numerous ; bracts of involucre one-third as long as rays, pinnatisect into linear lobes, of involucel shorter than umbellet, entire or trifid, membranous-margined ; petals radiating ; fruit scarcely .003 long, ovate ; prickles lanceolate, directed upward, *shorter than interval* — Summer — Near convent of Mar Sarkîs (Besherri).

† † *Fruiting umbellet convex. Prickles setaceous, separated to base.*

10. D. Jordanicus, Post. (Trans. Linn. Soc., 1888, p. 635) ⊙ .5 to .6, sparingly papillose, glabrescent ; stem *branching from base*, corymbose. Leaves oblong in outline, 2-3-pinnatipartite into *linear-subulate*, obtuse lobes. Umbels long-peduncled, rays 8-12, unequal, the longest .08 long in fruit ; bracts of involucre *linear, simple, callous at apex*, of involucel *ovate-acuminate, scarious-margined, ciliate,* shorter than pedicels ; petals moderately radiating ; fruit half to two-thirds as long as pedicel, .004 long, .003 broad, including setaceous prickles, which are longer than diameter of seed ; styles 4-5 times as long as stylopodia — April — El-Ghor.

65. CHÆTOSCIADIUM, Boiss. Chætosciadium.

Calyx-teeth short, subulate. Fruit oblong, somewhat dorsally compressed, apex narrowed into patellar stylopodia, crowned with the calyx-teeth. Mericarps all irregularly covered with long bristles. Ribs and intervals obsolete. Oil-tubes obscure, 4 dorsal, 2 commissural. Inner face of seed concave — Annual herbs, with aspect of Pimpinella, and white flowers.

Fig. 199.



Fruiting umbel of C. trichosperma.

C. trichosperma, L. ⊙ .1 to .4, appressed-hairy, dichotomous from base. Leaves oblong-ovate in outline, 2-pinnatisect, segments ovate to oblong, pinnately parted into oblong, acute lobes. Rays 3-6 ; involucre 0 ; bracts of involucel subulate; bristles 3-4 times as long as breadth of seed — Spring — Fields ; common.

66. CUMINUM, L. Cummin. *Cammûn.*

Calyx-teeth subulate, unequal. Fruit oblong, tapering at base and apex, somewhat compressed laterally, and somewhat constricted at commissure. Primary ribs filiform, obtuse, secondary as prominent or more so, more or less long-setulose. Oil-tubes under each secondary rib 1, thick. Stylopodia conical, tapering into rigid styles. Inner face of seed somewhat concave — Annual herbs, with minute, white or reddish flowers.

C. Cyminum, L. ⊙ .3 to .5, dichotomously branched from base. Leaves biternately dissected into long, filiform lobes. Ray 3-5, short ; bracts of involucre and involucel setaceous ; fruits .005 long, .002 broad — Spring — Fields ; cultivated, and escaped from cultivation.

67. TURGENIOPSIS, Boiss. Turgeniopsis.

Calyx-teeth short. Fruit laterally compressed. Primary ribs 5, filiform, narrow, papillose, the lateral at the edge of the mericarp; the secondary 4, broad, obtuse, with 2-3 rows of barbed bristles springing from a tubercle. Oil-tubes 1 under secondary ribs, slender or obsolete. Inner surface of seed concave — Annual, white-flowered herbs, with leaves dissected into capillary lobes.

T. fæniculacea, Fenzl. ⊙ .3 to .4, glabrous, dichotomously branched. Rays 2-3 ; involucre 0 ; bracts of involucel capillary ; fruit elliptical, .008 long, .005 broad, much longer than pedicel ; bristles half as long as breadth of seed — April and May — Rocks and stony places ; middle and subalpine zones of Lebanon, Antilebanon, Cassius, and northward.

68. TORILIS, Hoffm. Hedge-Parsley.

Calyx 5-toothed. Fruit laterally compressed. Primary ribs 5, setulose, secondary 4, hidden by the numerous prickles which occupy the whole interval. Oil-tubes 1 under each secondary rib. Inner face of albumen grooved — Annual, setulose herbs, with white or reddish flowers.

* *Involucre of* 4-6 *bracts.*

1. T. Anthriscus, L. ⊙ Leaves bipinnatisect into incised-dentate segments, the terminal one of the upper leaves elongated. Rays 5-12; petals not radiating; fruit ovate, .0025 long, .0015 broad — Spring — Hills of Gilead and Moab (Tristram).

* *Involucre* 0 *or of* 1 *bract.*

2. T. infesta, L. ⊙ .3 to .6, sparingly divaricate above. Lower leaves bipinnatisect into ovate or lanceolate, incised-dentate segments, the terminal one of the upper leaves much longer. Umbels long-peduncled, 2-8-rayed; fruit oblong, .006 long, .004 broad, including prickles — Spring — Hedges, and waste places; common.

Var. **occulta,** Post. Foliage dense, almost concealing the *short-peduncled* umbels — Saradah.

Var. **heterophylla,** Rchb. Upper leaves linear, entire. (*T. heterophylla, Guss.*)

3. T. triradiata, Boiss. et Held. .5 to .8, dichotomous. Lower leaves bipinnatisect, segments oblong, parted into short, oblong lobes; upper leaves with 3-5, oblong to linear, incised-dentate lobes, or entire. Umbels long-peduncled, *with* 2-3, *nearly equal rays;* umbellets small, few-flowered, compact; flowers somewhat radiating; fruit oblong, .005 long, .003 broad, including prickles — Spring — Beirût.

Var. **tetractis,** Post. Umbels frequently 4-rayed — Es-Salt (Gilead).

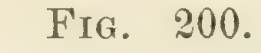


Fig. 200.



Fruiting umbel of T. triradiata.

4. T. neglecta, Rœm. et Sch. ⊙ .5 to 1, divaricately branched. Leaves bipinnatisect, segments rather large, oblong, incised-dentate; the upper leaves gradually diminishing. Umbels long-peduncled; rays 2-12; flowers radiating; fruit .005 long and broad, with both mericarps densely prickly, or with one mericarp prickly and the other tubercled — Spring — Fields and neglected places; common.

5. T. nodosa, L. ⊙ .3 to .5, stems *decumbent*, more or less zigzag, divaricately branched. Leaves bipinnatisect into oblong-ovate, incised-dentate to pinnatipartite segments. Umbels *sessile or short-peduncled, obsoletely* 2-3-*rayed, clustered;* flowers minute, not radiating; fruit .003 long and broad, including prickles, nearly sessile, *the inner mericarp often papillose* — Spring — Dry fields and roadsides; common.

69. CAUCALIS, Hoffm. Caucalis.

Calyx 5-toothed. Fruit somewhat laterally compressed. Primary ribs 5, filiform, bristly; secondary 4, more prominent, with 1-3 rows of prickles. Oil-tube 1 under each secondary rib. Inner face of albumen involute — Annual, white-flowered herbs; involucre 0, or of one bract.

* *Prickles in one row.*

1. C. daucoides, L. ⊙ Bur-Parsley. .1 to .3, dichotomous from base. Leaves ovate in outline, tripinnatisect into *short, linear-oblong lobes.* Umbels long-peduncled, equally 2-5-rayed ; fruit oblong, .012 long, .006 broad, including prickles, crowned with *lanceolate* calyx-teeth ; prickles hooked, *a little longer* than diameter of mericarps ; styles as long as stylopodia — Summer — Fields ; middle and subalpine zone of Lebanon and northward.

2. C. tenella, Desf. ⊙ .3 to .6 ; branches ascending. Leaves oblong in outline, tripinnatisect into *linear-setaceous* lobes. Umbels long-peduncled, with 5-9, unequal rays ; fruit oblong in outline, .005 long, .002 broad, including prickles ; prickles *thrice as long as linear* mericarp ; styles very short — Spring — Fields and grassy places ; common.

* * *Prickles in 2-3 rows.*

3. C. leptophylla, L. ⊙ .2 to .5, dichotomously branched. Leaves oblong in outline, bipinnatisect into linear lobes. Umbels with short or moderately long, thick peduncles, and 2-4, short, thick rays ; fruit oblong, .005 long, .003 broad, including prickles ; prickles in 3 rows, *twice* as long as diameter of mericarp ; *stigmas sessile* — Spring — Fields and dry places ; common.

Fig. 201.



Fruiting umbel of C. leptophylla.

Var. **erythrotricha,** Post. Prickles in two rows, purple, turning blackish — A little longer than diameter of fruit. (*C. erythrotricha, Boiss. et Haussk.*)

4. C. Gaillardoti, Boiss. ⊙ .2 to .4, dichotomously branched. Leaves *ovate to lanceolate* in outline, bipinnatisect into oblong-linear lobes. Umbels short- or long-peduncled, 2-3-rayed ; fruit oblong, .008 long, .005 broad, including prickles ; prickles in *three* rows, 4-5 times as long as diameter of mericarp ; *styles as long as stylopodia* — Spring — Stony places at base of Jebel Qaisûn (Damascus) ; Ras Beirut ; Sarada (above el-Ḥûleh).

5. C. fallax, Boiss. et Bl. ⊙ .3 to .6, slender, dichotomously branched. Leaves bipinnatisect into lanceolate, incised or pinnatisect segments, the terminal of the upper leaves often elongated, nearly entire. Umbels long-peduncled, 3-5-rayed ; fruit *ovate,* crowned by the *short* calyx-teeth ; prickles in *three rows,* longer than diameter of *ovate* mericarp ; styles *short* — Spring — Fields and thickets ; lower and subalpine Lebanon.

70. TURGENIA, Hoffm. Turgenia.

Calyx 5-toothed. Fruit laterally compressed, somewhat twin. The two ribs next to the raphe tubercled or armed with a single row of prickles, the seven dorsal each armed with 1-3 rows of nearly equal prickles. Oil-tubes 1 under each secondary rib. Albumen involute — Annual, scabrous herbs, with white or purplish flowers, the central staminate.

T. latifolia, L. ⊙ .3 to .4, dichotomously branched. Leaves ovate in outline, 1-2-pinnatisect into oblong, incised-serrate segments. Rays 2-3 ; bracts of involucre and involucel ovate, scarious ; fruit oblong-ovate, .014 long, .008 broad, including barbed prickles — Spring — Fields ; common.

FIG. 202.



Fruiting umbellet of T. latifolia.

Var. **genuina,** Boiss. Dorsal prickles long ; margin prickly.

Var. **tuberculata,** Boiss. Dorsal prickles long ; margin tubercled.

Var. **brachyacantha,** Boiss. Dorsal prickles short ; margin tubercled.

Var. **unifaria,** Post. Dorsal prickles in 1 row. Ribs densely scaly-tubercled — Aintâb.

71. LISÆA, Boiss. LISÆA.

Calyx 5-toothed. Fruits laterally compressed, constricted at commissure ; raphe linear. Lateral primary ribs obsolete, dorsal 3, expanded into sparingly denticulate crests ; secondary ribs obsolete or changed into a row of tubercles. Oil-tubes under secondary ribs obsolete. Albumen involute — Annual, scabrous, white-flowered herbs.

L. heterocarpa, D.C. ⊙ .4 to .5, pubescent, and scabrous with barbed bristles, sparingly dichotomous. Leaves pinnatisect, segments oblong-lanceolate, 1-2-dentate or incised. Rays 4-8 ; bracts of involucre and involucel membranous, lanceolate-cuspidate ; marginal petals .008 long ; fruit *tubercled,* crustaceous ; secondary ribs obsolete ; primary dorsal with 2-3 teeth, those of outer mericarps triangular, prickly, of inner short, unarmed or nearly so — Spring — Cultivated fields ; Cœlesyria and Antilebanon to Aintâb, and eastward.

Var. **Syriaca,** Post. Fruit *glabrous or minutely granular.* Teeth of outer mericarp 6-7. Foliage often more dissected than type — Grain fields ; more common in Syria than the type. (*L. Syriaca, Boiss.*)

TRIBE X LASERPITIEÆ.

72. LASERPITIUM, L. LASERPITIUM.

Calyx-teeth short. Fruit oblong, nearly terete. Primary ribs 5, filiform, secondary 4, expanded into equal wings, or the dorsal obsolete, the lateral at margin. Oil-tubes 1 under each secondary rib. Inner face of seed flat — Perennial, tall herbs, with white or yellow flowers.

L. glaucum, Post. ♃ 1 or more ; glabrous, glaucous ; stem stout, sparingly branched above ; neck densely fibrous. Lower leaves large, .2 to .3 long, ovate in outline, 2-ternately pinnatisect, the secondary petioles remote the leaflets ovate to round-ovate, heart-shaped at base, dentate, simple or 3-lobed, upper leaves reduced to oblong, glaucous sheaths. Rays 10-16, nearly equal, .02 long ; bracts of involucre and involucel oblong-lanceolate, acute, as long as rays and pedicels ; petals greenish ; fruit (immature) oblong, wings nearly equal — August — Akherdagh.

ORDER L. **ARALIACEÆ.** (ARALIA FAMILY.)

Herbs or shrubs with regular, perfect, or polygamous flowers, the calyx-tube adnate to ovary, 4-5-*dentate, the valvate, sessile petals* 5-10, *inserted by a broad base before a large, epigynous disk; the stamens as many as petals, alternating with them, the ovary inferior,* 1-∞-*celled, with* 1, *anatropous ovule in each cell; styles as many as cells, distinct, or more or less connate; fruit baccate, the endocarp divided into crustaceous pyrenes; seeds pendulous, albuminous.*

HEDERA, L. IVY. *'Amshaq.*

Calyx-lobes 5, short. Petals 5. Stamens 5. Disk convex. Styles connate in a cone, stigmas sessile at its apex. Ovary 5-celled. Berry crowned with scars of calyx-lobes, 5-celled; pyrenes ovoid-triquetrous; seeds solitary, ovate — A vine climbing over rocks and walls by rootlets from the branches.

H. Helix, L. ♄ Leaves angled, 5-lobed, those of flowering branches entire, ovate-rhombic, acuminate, all green, glabrous, glossy. Umbels panicled; calyx-lobes triangular, short and broad; fruit .005 in diameter, top-shaped-globular, black — October to February — Common along coast, and in mountains to middle zone.

ORDER LI. **CORNACEÆ.** (CORNEL FAMILY.)

Shrubs or trees, with simple leaves, the calyx-tube adherent to the 1-4-*celled ovary, the petals* 4-5, *valvate in bud, and (in ours) as many stamens inserted on the margin of an epigynous disk; style* 1; *ovule* 1, *anatropous, hanging from the top of the cell; the fruit a* 1-4-*stoned drupe, with albuminous seeds* — Calyx-margin 0, or truncate, or 4-5-dentate.

CORNUS, L. CORNEL. DOGWOOD.

Flowers perfect. Calyx 4-dentate. Petals 4, valvate. Stamens 4. Disk cushion-like. Ovary 2-celled, stigma simple. Drupe ovoid or oblong, 2-seeded, with osseous or crustaceous pip — Shrubs or trees with opposite leaves.

* *Flowers umbelled, with an involucre of* 4 *bracts, yellow.*

1. C. Mas, L. ♄ 3 to 5 or more; young branches appressed-hairy, then glabrescent. Leaves ovate to lenticular, acuminate. *Flowers preceding leaves, in few-flowered cymes;* petals *glabrous outside;* drupe *ellipsoid,* .013 *long,* .007 *broad, crimson* — Spring — Woods; Bludân; middle zone of Amanus, and northward.

* * *Flowers cymose-corymbose, not involucrate, white.*

2. C. Australis, C. A. M. ♄ 2 to 3 or more; branches straight, appressed-setulose. Leaves ovate-elliptical, obtuse to acuminate.

Cymes *many-flowered, flattish, developing after leaves.* Petals *setulose outside;* drupe *globular,* .005 *in diameter, black* — May and June — Thickets and woods; middle and subalpine zone of Lebanon to Nusairy Mountains, Cassius, Amanus, and northward.

Sect. II. Gamopetalœ. Petals more or less united into a 4-5- (rarely fewer, or 6-∞-) lobed corolla.

Order LII. CAPRIFOLIACEÆ. (Honeysuckle Family.)

Shrubs, or perennial herbs, with opposite leaves, stipules 0 *or interpetiolar, the calyx-tube coherent with the* 3-5-*celled ovary, its limb (in ours)* 5-*lobed or -toothed, the stamens as many as lobes of tubular, funnel-shaped, campanulate, or wheel-shaped, regular or bilabiate corolla, and inserted on its tube* — Fruit (in ours) a berry, crowned with minute calyx-lobes. Embryo small in fleshy albumen.

* *Corolla regular, wheel- or funnel-shaped. Inflorescence cymose*

1. SAMBUCUS. Herbs or shrubs, with pinnate, deciduous leaves.
2. VIBURNUM. Shrubs, with undivided, (in ours) leathery, evergreen leaves.

* *Corolla bilabiate, tubular or funnel-shaped. Inflorescence axillary.*

3. LONICERA. Climbing or non-climbing shrubs. Flowers twin or capitate.

1. SAMBUCUS, L. Elder. *Bailasân. Balasân.*

Corolla rotate, with 5, at length reflexed lobes. Stigmas 3, sessile. Berry (in ours) black, 1-celled by abortion of septa, 3-5-seeded — Herbs or shrubs, with pinnate leaves, and corymbose cymes of white flowers.

1. S. Ebulus, L. ♃ *Bailasân. Dimdamûn.* .6 to 1, herbaceous. Leaflets *oblong-lanceolate,* serrate, glabrous; stipules *leaf-like,* ovate, serrate. Cymes *ternate* at base — Summer — Thickets; coast, and mountains to subalpine regions, from Lebanon to Amanus, and northward.

2. S. nigra, L. ♄ Black Elder. 4 to 6. Leaflets *ovate-lanceolate to obovate,* serrate, glabrous; stipules *obsolete.* Cymes 5-6-*branched* at base — Spring — Cultivated, and subspontaneous. A tea, made of the blossoms, is used as a sudorific drink in fever.

2. VIBURNUM, L. Arrowwood. Laurestinus.

Corolla rotate-campanulate, 5-lobed. Stigmas 3, sessile. Berry 1-celled by abortion of septa, 1-seeded, (in ours) blue-black — Shrubs, with evergreen, leathery leaves and corymbose cymes of white flowers.

V. Tinus, L. ♄ 3 to 5. Leaves ovate-oblong, entire, bearded at axils of veins on under surface of leaf; stipules 0 — Spring — Middle and lower mountain regions; Carmel, Tabor, Lebanon and northward.

3. LONICERA, L. Honeysuckle. Woodbine.

Corolla tubular, funnel-shaped, or irregularly campanulate, with bilabiate limb. Style undivided; stigma 3-lobed. Berry with three, 2-3-ovuled cells, at maturity 1-celled by abortion.

* *Climbing shrubs.*

1. L. Etrusca, Santi. ♃ Glabrous. Leaves *deciduous*, glaucous, puberulent at lower surface, the lower *obovate*, short-petioled, the upper connate-perfoliate. Clusters capitular, near the end of the branches, *peduncled.* Corolla *glabrous;* tube longer than limb ; *style glabrous* — Spring — Rocky places and thickets ; coast and lower mountain regions, and northward.

Var. **viscidula,** Boiss. Branches of inflorescence and corolla glandular — Amanus.

Var. **hirsuta,** Post. Young branches hirsute. Leaves pubescent - Beirût; Qob-Eliâs.

* * *Shrubs, not climbing.*

† *Flowers capitate.*

2. L. implexa, Ait. ♃ Zigzag-branched, glabrous. Leaves leathery, ever-green, glossy above, glaucous below, *ovate*, the upper connate-perfoliate. Clusters terminal, *nearly sessile.* Corolla *puberulent;* tube longer than limb ; style generally hirsute — Spring — Thickets ; Baniâs.

† † *Peduncles axillary, 2-bracted, 2-flowered.*

3. L. nummularifolia, J. et Sp. ♄ *Disâr.* 2 to 3; young twigs and leaves (especially at lower surface) velvety. Leaves short-petioled, elliptical to obovate and ovate, obtuse or retuse, .015 to .025 long. Peduncles shorter than calyx. Corolla pinkish, *funnel-shaped;* tube a *little shorter than lips; berries distinct* — May and June — Lower and subalpine regions of Lebanon, Antilebanon, Amanus, Akherdagh, and northward.

Var. **cordata,** Post. Leaves retuse or cordate at base — Jebel Qulêb (Haurân).

4. L. Orientalis, Lam. ♄ 1 to 2 ; twigs glabrous or glabrescent. Leaves short-petioled, rounded or cuneate, occasionally sub-cordate at base, oblong, acute, .04 to .06 long, nearly glabrous above, more or less white-hairy below. Peduncles rather shorter than flowers. Corolla *bluish, short-campanulate;* tube gibbous, *very short; berries united* — Summer — Amanus, and northward.

ORDER LIII. RUBIACEÆ. (MADDER FAMILY.)

Shrubs or herbs, with opposite, entire leaves, connected by interposed stipules, or whorled without stipules, the calyx-tube coherent with the (in ours) 2-celled ovary, limb dentate or obsolete, stamens 4-5, as many as lobes of funnel-shaped, hypocrateriform, rotate, or campanulate, regular corolla, inserted on its tube — Flowers generally perfect. Style 1, generally 2-parted ; stigmas 2. Fruit capsular, 2-celled, dehiscent, many-seeded, or twin, nut-like or berry-like, with two, 1-seeded cells.

* *Fruit capsular, 2-celled ; cells many-seeded.*

1. OLDENLANDIA. Low annuals, with opposite leaves and rotate-infundibular flowers.

* * *Fruit berry-like.*

2. PUTORIA. Low shrubs, with opposite leaves, and hypocrateriform flowers.

3. RUBIA. Perennial herbs or shrubs, with whorled leaves, and rotate flowers.

** * * Fruit dry, composed of one, oblong mericarp.*

4. CALLIPELTIS. Flowers in extra-axillary cymes, each with a membranous bract.

** * * * Fruit dry, composed of twin, spherical, oblong, or crescentic mericarps, rarely by abortion* 1.

† Flowers axillary, ternate.

5. VAILLANTIA. Fruit with 3, deflexed horns, and 1, erect horn or small spur.

6. MERICARPÆA. Fruit composed of two crescentic, 3-crested mericarps.

† † Flowers in cymes or fascicles, often paniculate, rarely nearly solitary. Fruit composed of twin hemispheres, rarely by abortion 1.

7. GALIUM. Corolla rotate, or with very short tube.

8. ASPERULA. Corolla funnel-shaped or campanulate.

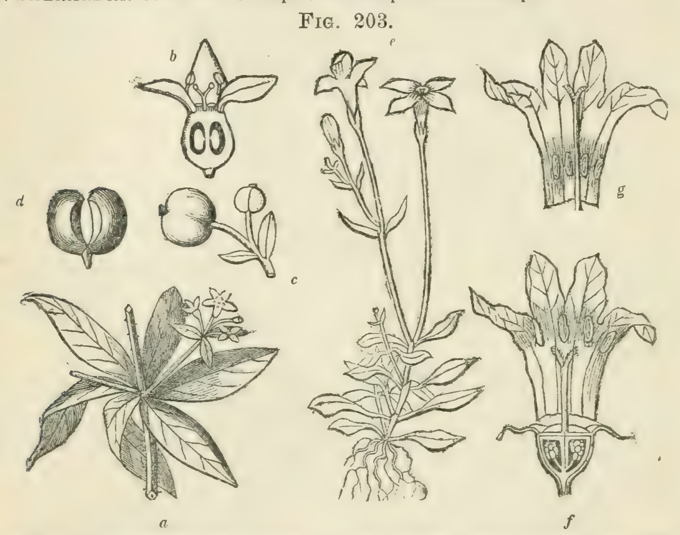
† † † Flowers in imbricated, 2-3-rowed spikes.

9. CRUCIANELLA. Corolla funnel-shaped. Mericarps (in ours) oblong or oblong linear.

† † † † Flowers capitate.

10. SHERARDIA. Corolla funnel-shaped. Mericarps 3-toothed at apex.

Fig. 203.



(*a*) Piece of Rubia tinctorum in flower. (*b*) Half of a flower, magnified. (*c*) Young fruits. (*d*) A ripe fruit. (*e*) A plant of Oldenlandia, in bud and flower. (*f*) A flower laid open showing the capsular ovary, the 4-lobed corolla, and the bifid style. (*g*) A corolla showing the 4 stamens, alternating with the corolla lobes, and inserted on its tube.

1. OLDENLANDIA, L. Bluets.

Flowers perfect. Calyx-tube top-shaped, 4-8-toothed, with a broad sinus between the teeth. Corolla rotate-funnel-shaped, 4-5-lobed. Stamens 4-5. Stigma bifid. Ovary 2-celled ; cells ∞-seeded. Capsule crowned by calyx-teeth, opening loculicidally — Low annuals, with opposite leaves and connate stipules united to petioles, forming a sheath.

O. Capensis, Thunb. ⊙ Hirsute, diffuse. Leaves linear, tapering at both ends. Flowers axillary ; pedicels as long as 4-toothed calyx — November — Mouth of Nahr Beirût. Probably adventive.

2. PUTORIA, Pers. Putoria.

Flowers perfect. Calyx-tube oblong, limb with 4, short teeth. Corolla hypocrateriform, with long, slender tube dilated above, limb 4-parted. Stamens 4, inserted near apex of corolla tube, filaments exserted. Style long, somewhat exserted ; stigma scarcely distinct from style, with 2, short lamellæ. Fruit an oblong berry, not splitting into two parts — Low shrubs, with opposite, petioled leaves, and pink flowers, and dark crimson berries.

P. Calabrica, L. ♄ .3 to .5, trailing or pendulous, drying black ; branches papillose-puberulent. Leaves oblong or oblong-lanceolate, obtuse, short-petioled, revolute-margined ; stipules connate, triangular. Flowers few, sessile, terminal, corymbose-capitate — May to August — Rocks ; Jerusalem to Lebanon, Aintâb, Marash and northward. *Very fœtid when young.*

3. RUBIA, L. Madder. *Fûwwah.*

Flowers perfect, cymose, rarely solitary. Limb of calyx obsolete. Corolla rotate, 5-parted. Mericarps hemispherical, berry-like. Ovules solitary implanted on septum—Perennial herbs or shrubs, with whorled leaves, scabrous-aculeolate along margin, and generally along nerves.

* *Stems erect or ascending, not climbing.*

1. R. Aucheri, Boiss. ♃ 1.5 to .5, glabrous. Leaves *in fours, rhomboid-elliptical*, mucronate, 1-nerved. Cymes few-flowered, trichotomous, from the upper and terminal axils ; anthers nearly globular — April to June — Woods ; Syrian coast ; lower and middle zone of Lebanon, Cassius, and Amanus.

* * *Stems climbing or trailing.*

2. R. tinctorum, L. ♃ Madder. *Fûwwah.* Stems long, *climbing, herbaceous*, scabrous. Leaves 4-6 in a whorl, oblong or lanceolate, often .06 long, *feather-veined below. Cymes leafy, much longer than axillary leaves.* Anthers linear-oblong — Spring and Summer — Hedges and thickets ; Moab and Gilead to Lebanon, Antilebanon, Damascus, Hems, and northward. *Roots red, (furnishing the well known dye).*

3. R. peregrina, L. ♃ Stems *climbing*, herbaceous, scabrous. Leaves 4-6 in a whorl, oblong or lanceolate, coriaceous, glossy, 1-nerved, prickly denticulate at nerve and margins. Cymes axillary and terminal, *longer than leaves ;* corolla lobes *long-aristate ;* anthers ovate — Spring — Upper Jordan Valley (Tristram).

4. R. Olivieri, A. Rich. ♄ Stems naked, *trailing*, decumbent ; branches flexuous, minutely puberulent when young. Leaves in sixes, lenticular-oblong, to obovate, *leathery, glossy*, 1-nerved, scabrous at margin. Cymes axillary, *scarcely longer than leaves.* Anthers ovate — Spring — Rocks and walls ; coast and lower mountain zone.

Var. **elliptica,** Boiss. Leaves elliptical or lenticular.

Var. **stenophylla,** Boiss. Leaves oblong-linear.

4. CALLIPELTIS, Stev. Callipeltis.

Flowers perfect. Limb of calyx obsolete. Corolla 4-3-parted ; tube 0. Stamens 4, very short. Style bifid ; stigmas globular. Ovary

by abortion 1-carpelled. Fruit oblong, consisting of 1 mericarp — Annual, dwarf herbs, with one, extra-axillary, sessile, 5-7-flowered cyme in each internode, flowers yellow, very short-pedicelled, the one in the fork naked, the rest subtended by a membranous, veined bract. Leaves in fours or twos, oblong-spathulate.

1. C. Cucullaria, L. ⊙ .05 to .2. Bracts *folded lengthwise, semilunar*, including the fruit — Spring — Rocky and shady places ; common.

2. C. aperta, Boiss. et Buhse. ⊙ .05 to .1. Bracts *flat, obovate*, somewhat retuse or obtuse, subtending the glabrous or sparingly scabrous fruit — Spring — Sinai, and probably in the Tîh.

5. VAILLANTIA, D.C. Vaillantia.

Flowers axillary, ternate, nearly sessile, the lateral staminate, the central perfect. Calyx-limb 0. Corolla rotate ; that of staminate flowers 3-fid, of perfect 4-fid. Styles 2, with capitate stigmas. Ovules 2 ; seeds often by abortion 1. Fruit recurved, with three deflexed horns, and a fourth, erect horn or small spur near the base at the back of the mericarp, the back of the mericarp with 3, longitudinal, dentate crests — Dwarf annual herbs, with leaves in fours, alternating with minute, sessile, yellow flowers.

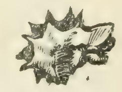
Fig. 204.



Fruit of V muralis

1. V. muralis, L. ⊙ .05 to .15. Fruit *pyramidal*, with three deflexed, and *one erect, conical, truncate horn*, all with fimbricated extremities, glabrous except along inner, ciliated border — Spring — Walls and rocks ; less common than the following.

Fig. 205.



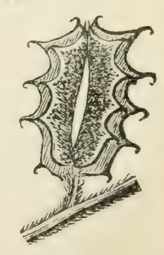
Fruit of V. hispida.

2. V. hispida, L. ⊙ .05 to .3. Fruit *crescentic*, with three deflexed and *no erect horn*, *hispid throughout*, and furnished with a small, conical, obtuse spur near the base of the mericarp — February to May — Rocks and walls ; common along coast and lower mountains.

6. MERICARPÆA, Boiss. Mericarpæa.

Flowers perfect. Calyx-limb obsolete. Corolla rotate, 4-parted. Stamens 4, short. Style 2-parted, stigmas globular. Mericarps oblong, becoming crescentic lengthwise, inner face grooved, outer 3-crested — Annual, dwarf herbs, with minute yellow flowers.

Fig. 206.



Fruit of M. vaillantioides.

M. vaillantioides, Boiss. ⊙ .05 to .1, strigulose ; branches prostrate or ascending from neck. Leaves in sixes, linear-elliptical, aculeolate at margins. Cymes axillary, nearly sessile, 3-1-flowered, middle pedicel almost 0, lateral short, thick ; crests of mericarps 5-7-toothed — Spring — Ḥaurân to Damascus, Aleppo, and northward.

7. GALIUM, L. Bedstraw. Cleavers.

Flowers perfect or polygamous. Calyx-teeth obsolete. Corolla rotate, 4-lobed, tube sometimes slightly campanulate. Fruit twin, dry; mericarps hemispherical or oblong-linear — Herbs, sometimes shrubby at base, with flowers in axillary cymes, panicled or corymbose, or flowers solitary, axillary.

* *Perennials. Flowers perfect. Peduncles even in fruit, erect.*

† *Corolla white. Leaves* 1-*nerved.*

1 G. Bocconi, 2 Schlumbergeri, 3 Pestalozzæ, 4 Ehrenbergii, 5 Tolosianum, 6 erectum, 7 Orientale, 8 Cilicicum.

† † *Corolla yellow, cream-colored, or greenish-yellow. Leaves* 1-*nerved.*

9 G. aureum, 10 verum, 11 Sinaicum.

† † † *Corolla purple. Leaves* 1-*nerved.*

12 G. canum, 13 Cappadocicum, 14 jungermanniodes.

* * *Annuals. Fruit on erect or reflexed pedicels, not covered by reflexed leaves.*

† *Ramification not whorled.*

‡ *Mericarps globular.*

§ *Fruits* .002 *to* .006 *long, twin. Corolla white.*

¶ *Flaccid, decumbent, or climbing, retrorsely scabrous plants.*

15 G. saccharatum, 16 tricorne, 17 verticillatum, 18 Aparine, 19 spurium, 20 pisiferum, 21 adhærens.

¶ ¶ *Dwarf, erect, glabrous or soft-puberulent plants.*

22 G. peplidifolium.

§ § *Fruits* .0005 *to* .001 *long. Corolla greenish, yellow, or purplish.*

23 G. divaricatum, 24 tenuissimum, 25 nigricans, 26 Syriacum, 27 Hierosolymitanum, 28 Judaicum, 29 Cassium, 30 setaceum, 31 Decaisnei.

‡ ‡ *Mericarps oblong or ovate.*

32 G. murale, 33 verticillatum.

† † *Ramification whorled. Fruit, globular, half as large as a hempseed.*

34 G. bracteatum.

* * * *Annuals or perennials. Fruit, on recurved pedicels, covered by reflexed leaves.*

35 G. coronatum, 36 Pedemontanum, 37 articulatum.

1. G. Bocconi, All. Ped. ♃ Stems ascending, pubescent below. Leaves in sixes and eights, oblanceolate, mucronate, the lowest pubescent, broader. Umbels trichotomous; corolla-lobes acute, not aristate; fruit glabrous—Spring—Pine forests of Gilead (Tristram).

2. G. Schlumbergeri, Boiss. ♃ .3, velvety; stems indurated at base, ascending, ending in a stiff, elongated panicle. Leaves in sixes, linear-lanceolate, mucronate; pedicels shorter than flowers; corolla-lobes triangular, the obtuse tip recurved; anthers *yellow;* ovary *velvety* — Summer — Mt. Hermon.

3. G. Pestalozzæ, Boiss. ♃ .1 to .25, glabrous, tufted ; stems filiform, tender, erect. Leaves in sixes, membranous, lenticular, nearly *translucent.* Inflorescence trichotomous, corymbose ; pedicels capillary, a little longer than flower ; corolla-lobes oblong, *acutish*, muticous ; anthers *pink ;* fruit *glabrous* — May and June — Subalpine Lebanon.

4. G. Ehrenbergii, Boiss. ♃ .15 to .25, tufted, *velvety-hispid*, drying blackish ; stems numerous, erect, tender, *brittle.* Leaves in sixes, linear-lanceolate, mucronate. Peduncles filiform, 1-3-flowered, pedicels slender, much longer than flowers ; lobes of corolla oblong, *obtuse*, not mucronate ; *anthers yellow ; fruit somewhat granular* — Summer — Natural Bridge, (Afqa).

5. G. Tolosianum, Boiss. et Ky. ♃ .05 to .08, tufted, *glabrous*, drying blackish ; stems decumbent-ascending, filiform, tangled, densely leafy. Leaves in *fours and fives*, small, thickish, glossy, *ovate or oblong-spathulate*, obtuse, not mucronate, tapering at base. Peduncles terminal, long-exserted, dichotomously 3-7-flowered ; bracts small, elliptical, acute ; pedicels scarcely longer than flowers ; lobes of corolla lanceolate, obtusely acuminate ; *anthers pale ; fruit smooth* — June — Amanus.

6. G. erectum, Huds. ♃ .2, *glabrous*, erect, more robust than the last three. Leaves in *eights*, *oblong to linear*, *somewhat dilated at apex*, acutish. Panicle narrow, with somewhat spreading branches ; pedicels longer than flowers ; lobes of milk-colored corolla *apiculate ;* fruit *scarcely wrinkled* — June — Amanus.

Fig. 207.



Fruits of G. Orientale.

7. G. Orientale, Boiss. ♃ .15 to .3, tufted, *velvety-hispid*, glabrescent, or glabrous. Leaves in sixes, *crowded*, linear, acute, with or without mucro, *with revolute margins*, and prominent nerve. *Cymes* in upper axils, 3-7-flowered ; with peduncle often longer than leaves, *forming a thrysoid panicle ;* pedicels about as long as flowers ; lobes of corolla lanceolate, somewhat hooded at apex, with or without mucro ; anthers turning blackish ; fruit usually smooth — Summer — Alpine and subalpine Lebanon, Antilebanon, Amanus, Akherdagh, and northward.

Var. **tenerum,** Boiss. .15 to .3 *glabrous*, tender. Leaves scattered, somewhat falcate — Lebanon ; Amanus.

Var. **alpinum,** Boiss. .1 to .15, herbaceous or shrubby at base, sometimes canescent. Corolla and fruit sometimes velvety — Lebanon ; Cassius ; Amanus ; Akherdagh.

Var. **elatius,** Boiss. .2 to .4, shrubby at base, stiffer, leaves stiffer, less crowded, more mucronate, canescent to glabrescent — Amanus to Akherdagh and Aintâb, and northward.

Var. **latifolia,** Boiss. Resembling var. alpinum, but with broader leaves — Antilebanon ; Nazareth.

Var. **hirtum,** Post. .1 to .16, velvety-hirsute. Leaves short. Inflorescence compact — Top of Mt. Cassius. (G. incanum, S. & S.)

8. G. Cilicicum, Boiss. ♃ .03 to .06, tufted, stems procumbent, slender, leafy, puberulent. Leaves in sixes, generally minutely hirsute, awl-shaped, mucronate, with prominent nerve beneath.

Flowers axillary, *forming interrupted spikes*, the lowest in pairs, short-peduncled, the upper nearly sessile, all shorter than axillary leaves ; lobes of corolla short-lanceolate ; anthers rust-colored ; fruit smooth — Summer —

Var. **alpinum,** Boiss. Spikes very short. Leaves often short, incurved — Amanus.

9. G. aureum, Visian. ♃ .3 to 1, light-green ; stems stout, velvety-puberulent or glabrous. Leaves in *sixes or eights*, *linear-oblanceolate*, obtuse, more or less mucronate, with prominent nerve below. Panicle *somewhat open*, *rather loosely flowered ;* pedicels as long as flowers, *to twice as long ;* lobes of corolla *long-cuspidate ;* anthers *black ;* fruit glabrous — Summer — Bushy places, and woods, in mountains, chiefly subalpine, from Moab to Lebanon, Antilebanon, Cassius, Amanus, and northward.

Fig. 208.

Fruits of G. aureum.

Var. **incurvum,** Boiss. Leaves *short-linear*, sometimes incurved. Panicle loose ; pedicels elongated.

Var. **scabrifolium,** Boiss. Leaves *elongated-linear*, scabrous. Panicle denser.

10. G. verum, L. ② .6 to 1 ; stems stout, puberulent, Leaves *in eights to twelves*, narrowly linear, acute, mucronate. Panicle *thyrsoid*, *cymes compactly flowered ;* pedicels *shorter than flowers ;* lobes of corolla *short-apiculate*, or obtuse ; anthers *yellow ;* fruit glabrous or *pubescent* — Summer — Subalpine Lebanon, Antilebanon, Cassius, Amanus, and northward.

11. G. Sinaicum, Dec. ♃ .04 to .15, tufted, scabrous-hirtulous ; stems decumbent, leafy below. Leaves all opposite in pairs, oblong-lanceolate to linear, .008 to .01 long. Cymes loose, *few-flowered ;* peduncles and pedicels capillary, the latter forked, generally longer than flowers ; corolla minute, dirty-yellow ; ovary minutely tubercled — May — Fissures of rocks ; Sinai.

12. G. canum, Req. ♃ .1 to ,3, shrubby at base, densely woolly-canescent ; stems brittle. Leaves in *fours and sixes*, ovate, ovate-oblong and lenticular to oblong-linear, .003 to .008 long, obtuse or acute, margins revolute. Cymes axillary, paniculate ; pedicels 2-4-times as long as minute flower ; corolla hirsute, lobes with or without mucro — May and June — A variable species.

Var. **musciforme,** Boiss. Leaves ovate *to ovate-oblong*, acute at both ends, .005 to .008 long, margins scarcely *or not at all revolute* — Subalpine Lebanon and northward.

Var. **laxum,** Post. Leaves *oblong-acuminate*, .008 long, margins strongly revolute — Coast and lower mountain regions.

Var. **confertum**, Post. Leaves *much crowded*, and *owing to strongly revolute margins* appearing oblong-conical, .003 to .005 long — Pendant from rocks, principally along coast, less frequently in lower mountain regions.

13. G. Cappadocicum, Boiss. ♃ .1 to .2, tufted, glabrous, *glossy, pale-green;* root-stock woody, stems slender, intricate. Leaves in sixes, oblong-elliptical to linear, .005 to .01 long, margin more or less revolute. Cymes from upper axils forming *a small, diffuse panicle;* pedicels 4-6 times as long as minute flowers; corolla glabrous or minutely hirsute; with oblong, mucronate lobes; fruit hispid — June and July — Rocks near the Baḥṣâṣ, Tripoli.

14. G. jungermanniodes, Boiss. ♃ .05 to .2, densely *tufted,* glabrous or minutely velvety or puberulent; stems *prostrate or ascending, capillary, tangled.* Leaves *needle-like,* in sixes, .003 to .005 long, the lower crowded, the upper scattered. Cymes 2-3-flowered, from upper and terminal axils; pedicels filiform, 4-5 times as long as minute flowers; lobes of glabrous corolla lanceolate; fruit hirsute — May to September — Alpine and subalpine Lebanon and Antilebanon.

Fig. 209.



Leaves and fruit of G. saccharatum.

15. G. saccharatum, All. Ped. ⊙ .1 to .3, glabrous, branching from base; branches slender, decumbent, retrorsely scabrous. Leaves in sixes, the lowest obovate, the others linear-lanceolate, margins beset with *erect* prickles. Cymes axillary, 3-flowered, shorter than leaves; *flowers polygamous,* the central fertile and lateral staminate; *fruit globular, densely warty* — Spring — Fields; common.

16. G. tricorne, With. ⊙ *Dibbaiqah.* .3 to .6, glabrous; stems flaccid, procumbent, retrorsely scabrous. Leaves in sixes and eights, linear, tapering, long-mucronate, margins and nerves with *retrorse, hooked* prickles. Cymes axillary, 3-flowered, shorter than leaves; flowers *perfect;* fruit *twin, mericarps sometimes* .006 *broad, minutely tubercled* — Spring — Fields; common everywhere.

Fig. 210.



Fruit of G. tricorne.

Var. **verruculosum,** Post. Fruits minutely warty — Qal'at-Muṣyâf (Nusairy Mountains).

17. G. verticillatum, Danth. ⊙ .1 to .15, glabrous or slightly scabrous; stems erect, filiform, rather stiff. Leaves *in fours and sixes,* linear-oblong, at length reflexed. Peduncles *axillary,* 2-5, each 1-flowered, *verticillate, erect in fruit;* fruit ovate, short-hispidulous, or glabrous; mericarps oblong — Spring — El-Jebel-el-Abiaḍ, between Hamath and Palmyra.

18. G. Aparine, L. ⊙ Cleavers. Goose-Grass. *Dibbaiqah.* .5 to 1; stems somewhat swollen at joints. Leaves *oblanceolate-linear,* .03 *to* .06 *long.* Peduncles axillary, longer than leaves; flowers perfect; fruiting pedicels divaricate, straight; *fruit* .005 broad, beset with *hooked prickles* — Spring — Fields and hedges; common throughout.

Fig. 211.



Fruit of G. Aparine.

19. G. spurium, L. ⊙ .4 to .5, not swollen at joints. Leaves in sixes and eights, *linear-oblanceolate*, .02 to .04 long. Peduncles axillary, longer than leaves ; flowers perfect ; fruiting pedicels *divaricate*, straight ; *fruit small*, .002 broad, glabrous or hispid — Spring — Fields ; common.

FIG. 212.



Leaves and fruit of G. spurium.

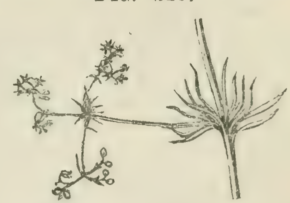
Var. **Vaillantii,** Gr. et Godr. Fruit hispid — Moab, Gilead, Aleppo, Aintab, and northward.

Var. **tenerum,** Gr. et Godr. Leaves, especially the lowest, oblong-spathulate to obovate. Fruit glabrous or hispid — Sinai.

20. G. pisiferum, Boiss. ⊙ .5 to 1, swollen at joints. Leaves in *sixes and sevens*, lower obovate-spathulate, middle and upper oblanceolate, mucronate, or tapering-aristate, .02 to .05 long, all tapering to a petiole. *Panicle leafy, rather compact, composed of dichotomously several times subdivided branches;* mericarps .004 to .008 broad, *strigillose or glabrescent, one often abortive;* pericarp white, separating from seed — Spring — Rocky and waste places; coast and coast range; Cœlesyria.

21. G, adhærens, Boiss. et Bal. ⊙ .3 to 1, sparingly hirsute or aculeolate. Leaves in *eights to twelves*, lowest elliptical to spathulate, the others linear-lanceolate to linear, tapering, mucronate. Peduncles from upper and terminal axils, elongated, horizontal, many times bi-trichotomous, forming a *diffuse, loose, somewhat naked panicle;* fruit .002 broad, *minutely granular*, nearly as long as pedicel — May and June — Hedges ; Lebanon, to Marash, and northward.

FIG. 213.



Flowers and leaves of G. adhærens.

22. G. peplidifolium, Boiss. ⊙ .1 to .25, green, *glabrous or soft-puberulent ;* stems simple or branching from neck, 2-3-tomously corymbose above. Leaves *in fours or fives, unequal*, tender or somewhat scabrous, lowest ovate, somewhat petioled, the others elliptical or elliptical-linear, .01 to .015 long. Peduncles trichotomous, filiform, rigid, pedicels 2-4 times as long as *glabrous*, .0015 *broad fruit* — April to June — Shady places; subalpine Lebanon.

FIG. 214.



Leaves and fruits of G. peplidifolium.

23. G. divaricatum, Lam. ⊙ .3 to .4, glabrous ; stems slender, 4-angled, erect, diffusely paniculate from base. Leaves *in fours to sevens*, linear-lanceolate, mucronate, with aculeolate margins, at length reflexed. Cymes 2-4-flowered, with long, setaceous peduncles ; pedicels

setaceous, *once to twice as long* as exceedingly minute, finely granulated, glabrous, rarely hirtulose fruit — Spring — Dry places; Lebanon; Beirût.

24. G. tenuissimum, M.B. ⊙ .3, glabrous; stem slender, zigzag, diffusely paniculate from base. Leaves *in sixes,* linear-lanceolate, long-mucronate, scabrous. Cymes 5-7-flowered, *very divaricate;* pedicels setaceous, much *longer* than minute, glabrous, rarely hirsute fruit — Spring — Rocky places; Syrian coast and lower ranges of Lebanon, Antilebanon, Cassius, and northward.

25. G. nigricans, Boiss. ⊙ .1 to .15, erect, scabrous, drying black, *divaricately branched,* corymbose. Leaves *in sixes to eights, linear,* with revolute margins, mucronate, more or less retrorsely scabrous. Pedicels filiform, hirsute or glabrous, 2-3-chotomous in fruit, twice as long as glabrous or somewhat hirsute, .001 long fruit — Spring — Vineyards and fields; Antilebanon to Ḥaurân, Aleppo, and northward, and eastward.

Var. **brachychætum,** Boiss. Bristle much shorter than lobe of corolla — Rasheiyah; Palmyra.

26. G. Syriacum, Boiss. ⊙ .06 to .1, glabrous, drying black; stem thickish, *divaricately branched from base,* corymbose. Leaves *in eights, short oblong-spathulate,* .003 to .005 long, mucronate, with retrorsely scabrous margins, the upper in pairs, narrower. Peduncles trichotomous; pedicels thickish, scarcely twice as long as flower and glabrous fruit — Spring — Aintâb.

27. G. Hierosolymitanum, L. ⊙ .3 to .5, glabrous or sparingly *hirsute,* drying more or less black; stem rigid, more or less *paniculately branched.* Leaves *in sixes to eights,* lowermost often obovate, others *lenticular to linear-lanceolate,* with more or less revolute, retrorsely scabrous margins. Peduncles capillary, *trichotomous;* cymes *dense;* floral leaves remote from flowers; pedicels capillary, hirsute, or glabrous, a little longer than hirsute or glabrous flowers; fruit glabrous or hispid, .0005 long — Spring — Shady places; common among rocks throughout, along coast and lower mountain regions, and tablelands.

FIG. 215.



Leaves and flowers of G. Hierosolymitanum, L. var. hispidum.

Var. **hispidum,** Post. Inflorescence and fructification hispid.

Var. **glabrum,** Post. Inflorescence and fructification glabrous. Rarer than last.

28. G. Judaicum, Boiss. ⊙ .1 to .25, branching from base, *hispid;* stems thickish. Leaves *in fours and fives,* obovate-spathulate to elliptical and linear, *with scarcely revolute margins, without mucro.* Cymes axillary and terminal, *sessile or on short,* often deflexed peduncles; ped-

FIG. 216.



Leaves and fruit of G. Judaicum, var. glabrescens.

icels twice or thrice as long as flower and .001 long, *uncinate*, *hispid* fruit — Spring — Rocky places ; southern Palestine to Lebanon.

Var. **glabrescens,** Post. Except inflorescence, very sparingly hispid or glabrous — Sarada ; Deir-el-Qal'ah.

29. G. Cassium, Boiss. ⊙ .2 to .3, glabrous, branching almost from base ; stems filiform, *diffusely forked*, corymbose. Leaves *in sixes to eights*, the lowest elliptico-linear, *the others narrowly linear*, the floral nearly solitary, usually shorter than pedunculated, *umbel-like* cymes. Pedicels *scarcely longer than flower and fruit ;* fruit appressed-strigulose or uncinate, hispid — Spring — Coast and lower hill country of northern Palestine, Lebanon, Cassius, and northward.

30. G. setaceum, Lam. ⊙ .1 to .2, glabrous, branching from base ; stems erect, filiform, paniculate. Leaves *in sixes to eights*, lowest oblong, upper *awl-shaped ;* floral capillary, overtopping flowers. Cymes axillary and terminal, 3-7-flowered, pedunculated ; pedicels capillary, about twice as long as flower and fruit ; fruit .0005 long, glabrous or uncinate-hispid — Spring — Dry hills and rocks ; lower mountains, and plains.

Fig. 217.

Leaves and fruits of G. setaceum, var. lasiocarpum.

Var. **lasiocarpum,** Boiss. Fruits hispid.

Var. **leiocarpum,** Boiss. Fruits glabrous or slightly scabrous.

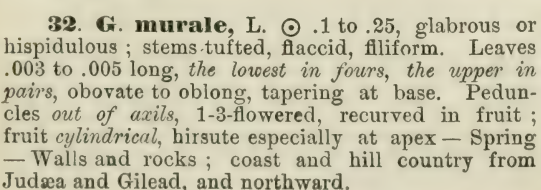
Var. **longipedicellatum,** Post. Pedicels 2-6 times as long as glabrous or glabrescent fruit — Ascent from Shittim Plain to Nebo.

31. G. Decaisnei, Boiss. ⊙ .1 to .4, glabrous or puberulent below ; stems slender fragile, 2-3-chotomously branched. Leaves *usually in sixes*, *linear*, *acute*, uppermost awl-shaped, solitary, somewhat longer than cymes. Cymes axillary and terminal, few-flowered, peduncled ; pedicels flexuous, *many times* longer than flowers and .0005 long, *glabrous fruit* — May and June — Rocks and shady places ; Damascus to Palmyra, Mt. Cassius, Aintâb, and northward, and eastward ; Mt. Sinai.

Fig. 218.



Leaves and fruits of G. Decaisnei.



32. G. murale, L. ⊙ .1 to .25, glabrous or hispidulous ; stems tufted, flaccid, filiform. Leaves .003 to .005 long, *the lowest in fours*, *the upper in pairs*, obovate to oblong, tapering at base. Peduncles *out of axils*, 1-3-flowered, recurved in fruit ; fruit *cylindrical*, hirsute especially at apex — Spring — Walls and rocks ; coast and hill country from Judæa and Gilead, and northward.

Fig. 219.



Leaves and fruits of G. murale, magnified 3 diameters.

33. G. verticillatum, ⊙ .1 to .15, glabrous or slightly scabrous ; stems erect, filiform, rather stiff. Leaves *in fours and sixes*, linear-oblong, at length reflexed. Peduncles axillary, 2-5, one-flowered, *verticillate*, *erect in fruit ;* fruit ovate, short-hispidu-

lous or glabrous : mericarps oblong — Spring — Subalpine Lebanon; el-Jebel-el-Abiad, between Hamath and Palmyra.

34. G. bracteatum, Boiss. ⊙ .04 to .08, papillose-scabrous ; stems simple or numerous, *much branched in whorls.* Leaves *in sixes to eights*, linear-spathulate, very obtuse, the upper linear ; floral solitary, usually longer than *sessile or subsessile cyme.* Flowers polygamous, the central perfect, the lateral staminate ; ovary densely beset with white, conical papillæ — May — Deir-el-Ahmar in the Buqâ', and eastward.

35. G. coronatum, S. et Sm. ♃ .15 to .4, shrubby at base, glabrous, or more or less pubescent. Leaves *in fours*, the lower linear to linear-elliptical and elliptical-obovate, small, 1-nerved, the upper *round-obovate*, growing, at length parchment-like, many-nerved. Mericarps .004 in diameter, wrinkled, *glabrous or hirsute* — April to June — Dry places, in mountains and interior plains, to subalpine and alpine regions.

Var. **glabrum,** Post. Glabrous or glabrescent.

Var. **pubescens,** Post. Pubescent.

Var. **stenophyllum,** Boiss. Lower leaves *linear to elliptical-linear*, .01 to .02 long — Gilead to Antilebanon, Nusairy Mountains, Cassius, Aintâb, and northward.

36. G. Pedemontanum, All. ⊙ Stems slender, simple, erect, retrorsely aculeolate, otherwise glabrous or hirsute. Leaves in fours, elliptical-oblong, 3-nerved, at length reflexed. Fruit *glabrous* — June — Afqa.

37. G. articulatum, L. ⊙ .1 to .2, glabrous, generally many-stemmed from neck. Leaves *in fours ;* lower *obovate, obtuse, tapering to a petiole ;* floral *cordate*, growing at length, parchment-like, many-nerved. Mericarps .002 to .003 in diameter, *striate with appressed, white papillæ* — Spring — Fields and waste places ; common throughout.

8. ASPERULA, L. Woodroof.

Flowers perfect, solitary or clustered, irregularly bracteate at base. Calyx-limb obsolete. Corolla funnel-shaped or campanulate, with 4-5, unappendaged lobes. Mericarps dry, hemispherical — Herbs or small shrubs, distinguished from Galium by the funnel-shaped corolla.

* *Perennials. Flowers* 5-*merous, in opposite fascicles, forming interrupted terminal spikes.*

1. A. glomeratum, M.B. ♃ .1 to .3, glaucous, shrubby at base ; stems ascending, brittle, more or less puberulent. Leaves in sixes, linear, revolute at margin, scabrous. Lower fascicles of flowers short-peduncled, the upper sessile ; bracts broader than leaves, lanceolate-linear ; corolla yellowish-green ; mericarps oblong, glabrous or puberulent — Summer — Highest alpine regions of Lebanon and Antilebanon.

* * *Annuals. Flowers* 4-*merous, capitate, blue or whitish flesh-colored.*

2. A. arvensis, L. ⊙ .2 to .5, erect, branching. Lower leaves in fours, obovate, the others in sixes and eights, linear, obtuse. Leaves of involucre *as long as or a little longer than blue flowers ;* lobes

of corolla somewhat hooded — Spring — Fields ; everywhere to subalpine regions.

3. A. setosa, Jaub. et Sp. ⊙ .05 to .2, branching almost from base. Lower leaves opposite, oblong; the others in fours and sixes, linear, obtuse. Leaves of involucre twice *as long as bluish or whitish flesh-colored flowers ;* lobes of corolla ovate, somewhat hooded — Spring — Alpine regions of Lebanon and Antilebanon.

4. A. Orientalis, Boiss. et Hoh. ⊙ .15 to .3, erect, branching. Lower leaves in fours, elliptical, the others in sixes and eights, linear, obtuse. Leaves of involucre *half as long* as blue flowers ; lobes of corolla ovate-oblong, acute, flat — Spring — Coast and Cœlesyria to Antilebanon, Aleppo, Aintâb, Marash, and northward.

Further study will probably show 2, 3, and 4 to be one species.

* * * *Perennials. Flowers 4-merous, variously grouped.*

† *Corolla funnel-shaped, yellow or lurid. Leaves narrowly linear with revolute margins.*

5. A. stricta, Boiss. ♃ .1 to .7, minutely scabrous or glabrescent ; stems stiff, flexuous, ending in interrupted, whorled spikes. Leaves in fours, mucronate. Bracts oblong-lanceolate, acuminate, somewhat connate at base ; mericarps ovate, tubercled — Summer — Mountains to alpine regions ; Lebanon, Antilebanon, Amanus, Akherdagh, and northward.

Var. **longifolia,** Boiss. Leaves longer, often short-mucronate. Bracts less acuminate — In lower and subalpine regions.

Var. **alpina,** Boiss. Dwarf, .1 to .2, more or less tufted. Leaves shorter, more crowded — Alpine regions.

Var. **latibracteata,** Boiss. Tall. Bracts broad-ovate, acuminate, more connate at base — Lebanon ; Amanus.

† † *Corolla funnel-shaped, white. Leaves ovate-oblong to elliptical or lenticular, flat.*

6. A. cymulosa, Post. (Journal of Linnæn Soc., Lond. Vol. xxiv., Bot., 1888, p. 432, under Galium), ♃ .1 to .15, glabrous, glossy, light-green ; stems 4-ribbed, somewhat forked, cymulose above. Leaves elliptical to lenticular, somewhat petioled, .008 to .012 long, *not scabrous at margins or along the indistinct nerves.* Cymes few-flowered, dense, from upper axils and terminal ; peduncles short, thick, strongly ribbed ; pedicels about as long as ripe fruits, ribbed ; fruit glabrous, twin, .001 long; mericarps hemispherical, .001 long—August and September — In mossy dells, at a height of 1000 m., on mountain east of Othmanîyeh (Amanus).

7. A. involucrata, Bergg. et Wahl. ♃ .3 to .5, glabrous, light-green; stems numerous, *not scabrous,* ascending. Leaves in fours, oblong to oblanceolate-spathulate, *obtuse,* 1-*nerved.* Flowers capitate, loosely corymbose ; bracts oblong-elliptical, much shorter than flowers ; corolla-tube gradually expanding into the limb, lobes ovate, obtuse, less than half as long as tube ; anthers *yellow,* nearly included ; style bifid ; mericarps semi-ovate, .0015 long — April and May — Berytdagh, and northward.

Var. **rigida,** Post. Stems *rigid.* Leaves *oblong-lenticular,* obtuse or *acutish.* Inflorescence more compact than in type — Mountains near Aintâb.

8. A. Libanotica, Boiss. ♃ .5 to 1, glabrous ; stems slender, *scabrous, flaccid,* ascending. Leaves in fours, ovate-oblong to lenticular, *somewhat 3-nerved, acutish.* Flowers capitate, loosely corymbose ; bracts elliptical-lanceolate, unequal, shorter than flowers ; corolla-tube gradually expanding into the limb, lobes ovate, acutish ; anthers *black,* nearly included ; style bipartite, exserted ; mericarps hemispherical, papillose — May and June — Moist places ; middle to subalpine Lebanon, Antilebanon, Cassius, and Amanus.

† † † *Corolla campanulate, white. Leaves obovate to elliptical-lanceolate.*

9. A. odorata, L. ♃ .3 to .4, glabrous, often drying black ; root-stock creeping ; stems erect, simple. Leaves 1-nerved, the lower in sixes, obovate, the others in eights, oblong-elliptical. Corymbs small, few flowered, peduncled ; mericarps globular, .002 in diameter, hispid with hooked hairs — Spring — Middle zone of Amanus, above Hassan Beyley.

10. A. Aparine, M.B. ♃ Glabrous, scabrous, *drying green ;* stems flaccid, *somewhat climbing.* Leaves in *sixes and eights,* retrorsely aculeolate, *oblong-lanceolate to elliptical.* Cymes terminal and axillary, *divaricately branched.* Mericarps globular, *glabrous, somewhat granular* — Summer — Ditches and hedges ; Beirût, to subalpine Lebanon, Shetoora, Damascus, Marash, and northward.

† † † † *Corolla campanulate, cream-colored or yellow. Leaves linear or oblong.*

11. A. humifusa, M.B. ♃ Glabrescent or papillose-puberulent, *drying black ;* stems *long, prostrate, ending in long, narrow panicles.* Leaves *in sixes, oblong-linear,* mucronate, scabridulous at margin, the lower reflexed. *Cymes contracted, dense ;* mericarps minute, hemispherical, glabrous — May and June — Waysides and moist places ; Damascus to Amanus, Aintâb, Marash, and northward.

Var. **pycnantha,** Boiss. Branches shorter, cymes denser. Fruit sometimes hirsute — Damascus to Lattakia, Aleppo and Aintâb.

12. A. breviflora, Boiss. ♃ .5 to .7, *pale-green,* shrubby below, many-stemmed, *rigid, erect, dichotomously branched,* Leaves *in sixes,* linear, revolute-margined, scabridulous, acute. Fascicles 3-7-flowered, axillary and terminal, short-peduncled, forming a narrow panicle ; mericarps globular, .001 in diameter, smooth, glabrescent — Summer — Middle and subalpine region, Lebanon and Antilebanon.

13. A. dissitiflora, Post. ♃ .4, minutely scabridulous, drying black ; root-stock woody ; *stems tortuous, procumbent.* Leaves in sixes, oblong-elliptical, obtuse or mucronate. Flowers *solitary, or rarely* 2-4 *in a cymule* from the upper axils ; peduncles and pedicels slender, shorter than leaves ; corolla drying whitish-green, tube a little shorter than ovate-oblong lobes ; anthers oblong, exserted ; fruit minute, globular, truncate. Summer — Woods of middle region of Amanus. *Distinguished from most of the Asperulæ by its flaccid, Galioid stems and leaves, and scattered, minute flowers.*

9. CRUCIANELLA, L. Crosswort.

Flowers perfect, solitary or twin, with 3, scarious, green-vittate bracts at base, forming imbricated, 2-3-rowed spikes. Calyx-limb obsolete. Corolla funnel-shaped, with 4-5 lobes, ending in a caudiform, introflexed appendage. Style bifid ; stigmas globular. Mericarps dry, oblong or oblong-linear —Annual or perennial herbs, sometimes shrubby at base, flowers opening at night.

** Annuals.*

† *Outer bracts of opposite spikelets connate for half their length.*

1. C. latifolia, L. ⊙ .5 to .8. Lower leaves obovate, upper lanceolate to linear, margins revolute. Spikes .1 to .3 long ; bracts lanceolate, ciliate, scabrous-margined ; corolla-tube *longer* than bracts — Spring — Dry hills ; common along coast and coast ranges of mountains.

† † *Outer bracts of opposite spikelets not connate.*

‡ *Corolla-tube not less than once and a half as long as bracts.*

2. C. macrostachya, Boiss. ⊙ .3 to .6. Lower leaves oblong, upper lanceolate to linear, margins revolute. Spikes .1 to .3 long ; bracts oblong-linear, scabrous-margined ; corolla twice as long as bracts — Spring — Dry hills ; common along coast, and in mountains to 1200 m.

Var. **hispidula,** Boiss. Spikes less than .1 long. Margins and sometimes back of bracts hispidulous — Subalpine Lebanon.

Var. **brachystachya,** Boiss. Spikes .015 in length. Leaves narrower — Abeih ; rocks near Antioch ; Marash.

Var. **penicillata,** Boiss. Low. Spikes .01 to .1 long. *Corolla-tube scabrous, and limb hispid without* — Zahleh, Aintâb, and northward.

‡ ‡ *Corolla shorter than bracts, or a little longer.*

3. C. imbricata, Boiss. ⊙ .3. Lower leaves ovate-oblong, the rest linear, revolute. Spikes .03 to .05 long, *dense, linear-cylindrical ;* outer bracts ovate-oblong, round-backed, scarcely keeled, lateral keeled, linear, shorter; corolla *somewhat shorter than bracts* — Spring — Syria, place not noted (*Boiss.*).

4. C. membranacea, Boiss. ⊙ .2 to .5, branched from base, erect. Leaves linear, *white*, acute, very scabrous. Spikes *ovate-oblong, short*, at length elongated, .02 to .05 long, loose ; bracts lanceolate, very acute, keeled, *very broadly membranous*, the outer longer, recurved-falcate ; corolla-tube *somewhat longer* than bracts — Spring — Et Tîh, and southward.

* * *Annuals. Mericarps transversely wrinkled-pitted, minutely tubercled.*

5. C. ciliata, Lam. ⊙ .1 to .15 ; stem slender, simple, or with spreading branches. Leaves linear, revolute-margined. Spikes *oblong-linear*, .02 to .05 long, rather loose ; bracts linear-lanceolate, very acute, somewhat tapering at base, *white-nerved at back*, narrowly membranous-margined, very scabrous ; corolla *much shorter* than bracts — Spring — Sinai ; Damascus to Aleppo, and el-Jebel-el-Abiad (Syrian Desert).

Var. **hispidula,** Boiss. Bracts hispidulous — Middle region of Mt. St. Catherine (Sinai).

* * * *Perennials. Inner bracts long connate, flattened, boat-shaped.*

6. C. maritima, L. ♃ Stems procumbent, shrubby at base, white. Leaves in fours, short oblong-lanceolate, leathery, densely imbricated at base of stems and along branches. Spikes dense, ovate to oblong-lanceolate, .02 to .04 long ; outer bract ovate to ovate-elliptical, acuminate, inner ovate-oblong ; corolla once and a half as long as bracts — Spring — Sands near Jaffa, and southward to Egypt.

10. SHERARDIA, L. Field Madder.

Flowers perfect, capitate, involucrate. Calyx-tube ovate, margin 6-toothed, persistent, growing. Corolla funnel-shaped, with 4, non-appendaged lobes. Fruit dry ; mericarps 3-toothed at apex — Annuals, with aspect of Galium.

Fig. 220.



Involucre and flowers of S. arvensis.

S. arvensis, L. ☉ Little Field Madder. .1 to .4, branching from base, branches decumbent or ascending. Lower leaves in twos and fours, obovate, mucronate, the others in sixes, oblong-obovate to linear-lanceolate. Flowers 4-8, nearly sessile ; involucre leaves connate at base, oblong-lanceolate, longer than lilac flowers ; mericarps rough, a little shorter than crown — Spring — Fields ; everywhere.

Order LIV. VALERIANACEÆ. (Valerian Family).

Annual or perennial herbs, with opposite leaves and no stipules ; the calyx-tube coherent with the ovary, which has only one cell, or one fertile and two abortive ones ; stamens free, 1-4, *fewer than the lobes of the corolla, inserted on its tube* — Flowers regular or irregular, hermaphrodite or diœcious ; limb of calyx obsolete, dentate, or expanded into pappus ; corolla tubular or funnel-form, base of tube often gibbous or spurred, 3-5-lobed. Fruit dry, indehiscent.

* *Calyx-limb involute in flower, expanded in fruit to a feathery pappus.*

1. VALERIANA. Corolla gibbous above base. Stamens 3.

2. CENTRANTHUS. Corolla more or less spurred at base. Stamen 1.

* * *Calyx-limb dentate or crown-like in fruit, regular or irregular, or* 0.

3. VALERIANELLA. Corolla without protuberance or spur. Stamens 3.

1. VALERIANA, L. Valerian. *Hashishat-ul-Hûr.*

Calyx-limb involute during flowering, expanded in fruit into a feathery pappus. Corolla tubular-funnel-shaped, gibbous above base, 5-lobed. Stamens 3. Fruit 1-celled — Perennial herbs.

* *Root-stock præmorse, simple, bearing fibres.*

1. V. sisymbriifolia, Desf. ♃ .3 to .5. All the leaves pinnatisect, with 2-3 pairs of *ovate-orbicular*, sub-petioled, *entire* leaflets. Bracts linear, *somewhat shorter* than *hirsute* fruit ; corolla flesh-colored, *tube once and a half* as long as limb — Spring — Mountains of Gilead and Moab.

* * *Root bearing oblong, clustered corms.*

2. V. Dioscorides, Sibth. ♃ .3 to .6. Root-leaves lyrate, or *oblong-elliptical*, *entire*, small ; stem-leaves pinnatisect, with 4-7 pairs of *oblong* to linear, *repand or dentate* leaflets. Bracts oblong-triangular, *one-half to one-third* as long as fruit, which is *hirsute only between nerves;* corolla pink, tube about as long as limb — Spring — Rocky woods ; Syrian coast and Lebanon, to Cassius, Aintâb, and northward.

2. CENTRANTHUS, D.C. Centranthus.

Calyx-limb involute during flowering, expanded in fruit into a feathery pappus. Corolla tubular-funnel-shaped, more or less long-spurred at base, 5-lobed. Stamen 1. Fruit 1-celled — Perennial, glabrous, glaucescent herbs, with pink flowers in thyrsoid panicles.

1. C. ruber, L. ♃ .5 to 1. Leaves *ovate or ovate-lanceolate*, nearly entire. Spur of corolla about *half as long* as tube, and *twice* as long as ovary — Summer and early Autumn — Lebanon ; Marash. Probably escaped from cultivation.

2. C. longiflorus, Stev. ♃ .6 to 1.5. Leaves *lanceolate-linear*, entire. Spur of corolla *about as long* as tube, and thrice as long as ovary — Late summer and autumn — Subalpine regions of Lebanon and Antilebanon, to Amanus, and northward.

Var. **latifolius,** Boiss. Leaves broader, sometimes ovate-lanceolate — Same range as type.

3. VALERIANELLA, Hall. Lamb's Lettuce.

Calyx-limb persistent, dentate or crown-like, regular or irregular, sometimes 0. Corolla funnel-shaped, spurless, 5-lobed, regular. Stamens 3. Fruit with two sterile and one fertile cell—Annual, dichotomous herbs, with small flowers crowded in head-like cymes, or solitary in the upper forks.

* *Fruits all of one kind, oblong-cylindrical, or ovate-oblong.*

† *Sterile cells filiform.*

‡ *Calyx-limb unequally parted into* 10-14, *hooked, subulate lobes.*

1. V. tuberculata, Boiss. ⊙ .02 to .1, glabrous. Leaves entire, linear-oblong, obtuse. Fruiting branches *thickened*, somewhat constricted at forks, brittle. Fruits somewhat fungous, tubercled-prickly at back, grooved in front, with two parallel gibbi at base ; fruits of lower forks often twice as large as the rest, dilated at base, scarcely grooved, tapering above ; calyx-limb hypocrateriform — Spring — Subalpine and alpine Antilebanon.

‡ ‡ *Calyx-limb equally parted into* 6, *hooked, subulate lobes.*

2. V. dactylophylla, Boiss. et Hoh. ☉ .1 to .3, glabrescent or scabrous at nodes and margins of leaves. Lower leaves oblong, nearly entire, the others digitate, with linear lobes, the terminal lobe broader and much longer. Fruiting branches scarcely thickened ; cymes capitate ; fruits pruinose, with a narrow groove in front, and two *convergent* gibbi at *dilated* base ; calyx-limb campanulate — Spring — Subalpine Lebanon and Antilebanon.

FIG. 221.



Fruits of V. dactylophylla, magnified ten diameters

‡ ‡ ‡ *Calyx-limb oblique, reticulate, unequally parted into 2, subulate lobes.*

3. V. diodon, Boiss. ☉ .15 to .3, puberulent or pruinose, *intricately branched, corymbose.* Leaves glabrous, oblong to linear, Fruiting branches not thickened ; fruits *solitary* in forks and at tips of branches, cylindrical, pruinose, grooved in front, the prominent borders of the groove *prolonged below into divergent crests,* which *unite at base, and surround a circular area ;* one of the lobes of the calyx-limb sometimes wanting — Spring — Fields ; Haurân to base of Antilebanon, Damascus, Aleppo, and northward.

FIG. 222.



Fruit of V. diodon, magnified ten diameters.

† † *Sterile cells much broader than fertile.*

4. V. Szovitsiana, F. et M. ☉ Hispidulous or glabrescent. Leaves oblong-linear. Flowers of forks solitary ; cymes short, one-sided ; fruits glabrous or hispidulous, white, marked in front by an oblong-ovate pit ; calyx-limb oblique, short, tubular-auricled, reticulate, *with a lateral, linear, horizontal, somewhat recurved lobe,* entire or denticulate at tip, as long as fruit, and a very small accessory lobe — Spring —Fields ; et Tîh to Cœlesyria, Aleppo, and northward, and eastward.

* * *Fruits of two kinds, those of forks 1-celled, cylindrical-prismatic, those of cymes ovate or oblong, spongy, deeply grooved ; cymes small, flat, dense ; fruiting branches dilated, club-shaped.*

5. V. echinata, L. ☉ .1 to .3, glabrous. Lower leaves oblong-spathulate, entire or dentate, the others oblong, sessile, sinuate-dentate or incised-pinnatifid at base. Fruit fungous, remaining attached to cyme, oblong, unequally 3-grooved and 3-ribbed, the fertile cell often gibbous, crested ; calyx-limb *unequally* 3-toothed, *the posterior tooth the smallest, one of the lateral at the tip of the fertile cell small, the other much longer and thicker, all hooked ; one of the sterile cells posterior, filiform, the other about as broad as the fertile* — Spring — Fields ; Galilee, Lebanon, Antilebanon, and northward.

FIG. 223.



Fruit of V. echinata magnified 3 diameters.

6. V. Soyeri, Buch. ☉ .1, glabrous. Lower leaves oblong-spathulate, the others sessile, incised at base. Fruits not fungous, separating from cyme, ovate-oblong, somewhat incurved, irregularly

3-grooved, fertile cell gibbous ; calyx-limb unequally 3-toothed, the posterior and one lateral tooth very small, *almost obsolete*, the other thick at base, subulate, incurved ; *one of the sterile* cells posterior, about as large as the fertile, *the other twice as broad* — Spring — Mountains of Moab.

7. **V. Orientalis,** Schlecht. ⊙ .1 to .3, glabrous. Lower leaves oblong-spathulate, entire, upper sessile, dentate or incised. Fruits fungous, at length separating from cyme, ovate, many-grooved behind, deeply cleft in front, crowned with 3, short, conical, erect, *nearly equal teeth*, the *posterior a little smaller ; both the lateral sterile cells in front, much broader than the small, posterior, fertile cell* — Spring — Fields ; Gilead to Cœle-syria, Nusairy Mountains, Aleppo, Aintâb, and northward.

Fig. 224.



Fruit of V. Orientalis, magnified 8 diameters.

* * * *Fruits of one kind, small, ovate, the sterile cells filiform, converging at base. Calyx-tube tubular, obliquely truncate, auricled, entire or denticulate.*

8. **V. Morisoni,** Spreng. ⊙ Tall, scabrous at margins of leaves and angles of stems. Lower leaves oblong, entire, upper dentate at base. Fruiting branches scarcely thickened ; fruit glabrous ; *calyx-limb not reticulate, denticulate, narrower than fruit*, and half as long — Spring — Tops of mountains in Gilead (Tristram).

9. **V. truncata,** Rchb. ⊙ .1 to .3, scabrous at nerves of leaves and angles of stems. Lower leaves oblong, upper linear, 1-2-dentate at base. Fruiting branches at length thickened ; fruit hirtulous or glabrous ; calyx-limb *reticulate-veined, nearly entire, about as broad and long as fruit* — Spring — Fields ; Gilead to Aleppo ; Syrian coast, Lebanon, and northward.

Var. **muricata,** Boiss. Calyx-limb more acute and oblique, usually with a small tooth on each side in front — Jerusalem.

* * * * *Fruits of one kind, small, globular or ovate-oblong, the sterile cells narrower or broader than the fertile. Fruiting branches not thickened.*

† *Calyx-limb reduced to a small tooth arising from the posterior cell.*

10. **V. carinata,** Loisel. ⊙ .15 to .4, scabrous at angles. Leaves finely ciliate, the lower spathulate, obtuse, the upper sometimes denticulate. Cymes *capitate ;* fruits glabrous, or puberulent, ovate-oblong somewhat incurved, convex behind, *deeply grooved in front, grooved and keeled at each side ;* the anterior sterile cells nearly as broad as the posterior fertile cell — Spring — Lebanon and Nusairy Mountains to Aleppo, Aintâb, and northward, and eastward.

† † *Calyx-limb with* 3, *oblique, broad, short lobes, the lateral sometimes* 0.

11. **V. tridentata,** Stev. .1 to .4, somewhat scabrous. Lower leaves linear-spathulate, entire, intermediate linear, often dentate or incised at base. Cymes *flat, loose ;* fruits minute, soon deciduous, glabrous, rarely hirsute, nearly globular, convex behind, *flat in front, with an umbilical depression in the centre ;* the anterior *sterile cells divergent, ribbed or keeled, broader than the posterior, narrow, fertile cell* —

Spring — Grassy places ; Haurân to Damascus, Aleppo, and northward, and eastward.

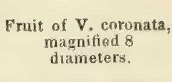
* * * * * *Fruits of one kind, large, top-shaped, grooved in front, the sterile cells about as broad as or broader than the fertile. Calyx-limb crown-like.*

† *Cymes rather dense. Calyx-limb* 2-3-*parted.*

12. V. Dufresnia, Bge. ⊙ Glabrous ; stem thick, simple or branching from neck. Leaves oblong-linear, obtuse, entire. Cymes dense ; fruiting branches scarcely thickened ; fruits white-woolly with a triangular pit, and two, prominent gibbosities under the crown in front ; *calyx-limb* 3-*lobed to base, lobes round, pellucid,* reticulate, *acutely dentate ; the posterior somewhat longer* — April to June — Palmyrene Desert.

†† *Cymes capitate. Calyx-limb cup-shaped, or rotate, or globular-inflated,* 5-7-*lobed.*

Fig. 225.



Fruit of V. coronata, magnified 8 diameters.

13. V. coronata, W. ⊙ .1 to .5, pubescent below. Lower leaves oblong, upper linear, dentate or pinnatifid at base ; fruit villous, marked with a deep, oblong-linear groove in front ; calyx-limb *cup-shaped,* .003 *broad,* reticulate, *with* 6, *ovate, acute lobes half its length, ending in hooked awns* — Spring — Fields and waste places ; common throughout.

14. V. Kotschyi, Boiss. ⊙ .1 to .3, glabrous, much branched from base. Leaves oblong-lanceolate, remotely denticulate, the upper pinnatifid at base. Fruit woolly, somewhat keeled behind, and deeply grooved in front ; calyx-limb glabrous, *nearly rotate,* .003 *broad,* reticulate, *with* 6, *broad-triangular, very short lobes,* ending in a short, hooked mucro — Spring — Haurân to Aintâb, Lebanon, Nusairy Mountains, Aleppo, and eastward.

Fig. 226.



Fruit of V. Kotschyi, magnified 6 diameters.

Var. **Boissieri,** Post. Calyx-limb between rotate and cup-shaped ; teeth 4-6, with a very short, straight mucro or 0 — Between Bosrah and Qurêyah (Haurân). (*V. Boissieri, Krok.*).

15. V. obtusiloba, Boiss. ⊙ .2 to .3, puberulent below. Lower leaves spathulate, entire or dentate, upper linear, entire or pinnatifid at base. Fruit villous, with an ob-triangular pit on its anterior and upper face ; *calyx-limb* .008 *broad, rotate,* reticulate, glabrous, *with* 6, *ovate-triangular,* obtuse lobes, *each with* 3-5, *hooked awns at apex* — Spring — Syrian coast and lower maritime slopes of Lebanon.

Fig. 227.



Upper aspect of fruit of V. vesicaria, magnified 4 diameters.

16. V. vesicaria, Willd. ⊙ .1 to .5, puberulent and ciliate below. Leaves remotely dentate, the middle often pinnatifid at base. Fruit villous, with a circular pit on its anterior face, at base of limb, *calyx-limb globular,* .005 *in diameter, inflated,* reticulate, puberulent, *the mouth circular, furnished with* 6, *small, triangular, awl-shaped, inflexed teeth, their points nearly meeting in the centre* — Spring — Fields and waste places; common throughout.

ORDER LV. DIPSACEÆ. (TEASEL FAMILY).

Robust herbs, with opposite or whorled leaves, no stipules, and perfect flowers, each with a tubular, calyx-like involucel, aggregated in heads, with an involucre as in Compositæ, or (in Morina) in axillary whorls; calyx-tube adnate to base of ovary; corolla inserted on apex of calyx-tube; stamens free; style 1, stigma simple; ovary 1-celled; seeds albuminous — Calyx-limb cup-shaped, disk-like, or divided into pappus; corolla-limb 2-5-lobed, sometimes irregular. Fruit indehiscent, dry, included in involucel, often adnate to it, apex free, crowned with calyx-limb.

* *Flowers whorled. Corolla bilabiate. Stigma terminal, straight.*

1. MORINA. Calyx-limb with two, leaf-like lobes.

* * *Flowers in heads. Corolla not labiate; tube short. Stigma oblique.*

2. DIPSACUS. Involucel truncate at apex or with crenate or minutely toothed crown; calyx-limb cup-shaped or disk-like, truncate or entire.
3. CEPHALARIA. Involucel 4-8-toothed, or naked; calyx-limb umbonate, ∞-toothed.
4. KNAUTIA. Involucel minutely toothed; calyx-limb unequally 4-6-toothed.
5. SCABIOSA. Involucel ending in a scarious crown; calyx-limb 5-aristate.
6. PTEROCEPHALUS. Involucel ending in a short crown; calyx-limb with 12-24, plumose awns.

1. MORINA, Tourn. MORINA.

Involucel unequally spiny-dentate at apex. Calyx-limb with two, leafy lobes. Corolla tubular-ringent, upper lip bifid, lower trifid. Stamens 4, of which 2 are rudimentary — Perennial herbs, with thistle-like leaves, forming an involucre to the whorls of long-exserted, showy, pink flowers. .

M. Persica, L. ♃ .6 to 1. Stem stout, grooved. Leaves leathery, the lower linear, petioled, the floral sessile, ovate, all sinuate-pinnatifid, with spiny lobes. Flowers nearly sessile; longer spines of involucel as long as calyx-limb, or longer; calyx-limb obovate-oblong, obtuse or retuse; corolla pubescent, .05 to .06 long — Summer — Middle and subalpine Lebanon and Antilebanon, to Aintâb, Marash, and northward.

2. DIPSACUS, L. TEASEL.

Involucel 4-angled, grooved, truncate at apex, with an almost obsolete, denticulate margin. Calyx-limb cup-shaped. Receptacle chaffy. Involucre leaves in one row — Stout, tall, monocarpic herbs, with large, .05 to .06 long, ovate heads of small flowers, almost hidden by their long-aristate pales.

1. D. sylvestris, L. ⊙ 1 to 1.5, prickly. Leaves *glabrous or aculeate, crenate-serrate*, sessile, the lowest tapering at base, the others connate at base, the intermediate sometimes pinnatifid. Pales *oblong-obovate* — May to September —

Var. **comosus,** Ledeb. Upper pales as long as head — Fields; Subalpine Lebanon.

2. D. laciniatus, L. ⊙ 1 to 1.5, prickly. Leaves *setose-ciliate*, sessile, the lowest tapering at base, the others connate at base, crenate-lobed *or pinnatifid. Pales oblong* — May to September — Fields ; Cœlesyria to Damascus, Amanus, and northward.

3. CEPHALARIA, Schrad. CEPHALARIA.

Involucel 4-angled, grooved, (in ours) 4-8-toothed at apex. Calyx limb basin-shaped, many-toothed. Corolla 4-fid. Receptacle chaffy. Involucre composed of several rows of imbricated scales — Perennial herbs, often shrubby at base, or annuals, usually tall.

* *Annuals.*

† *Leaves lyrate or pinnatisect. Flowers white or pinkish.*

1. C. setosa, Boiss. et Hoh. ⊙ .6 to .8, *more or less bristly.* Heads .02 broad ; bracts and *pales ovate-oblong*, tomentellous, light-green, *ciliate-margined, abruptly narrowed into a brownish awn ;* teeth of involucel eight, *four subulate, half or more than half as long as involucre, the other four intermediate, very short* — June — Rocky places, Gilead to Cœlesyria, Antilebanon, Amanus, Marash, Aintâb, and eastward, and northward.

2. C. tenella, Paine. ⊙ .2 to .5, branching above, *not bristly.* Heads .006 to .008 in diameter ; bracts *deltoid-orbicular*, purplish ; pales *subulate, aristate ;* involucel silky, teeth 4, shorter than tube — Spring — Top of Jebel Húsha'.

3. C. Joppensis, Spreng. ⊙ .6 to 2, sparingly bristly, diffusely branched. Heads .01 long ; bracts ovate, obtuse, silky ; *pales somewhat truncate, mucronate ;* teeth of involucel 8, equal, a little longer than base of calyx — Summer — Common in fields and by roadsides.

† † *Leaves undivided, or with few, minute lobes at base. Flowers equal, blue.*

4. C. Syriaca, L. ⊙ .5 to 1.5, bristly ; stem stiff, *trivaricately branched above.* Leaves sessile or nearly so, the lower *oblong-lanceolate*, entire or serrate, often .1 to .15 long, the upper linear, entire. Peduncles *long*, stiff, or heads in forks sessile ; heads ovate, .02 long ; bracts and pales obovate, ending abruptly in a long awn ; involucel hirsute, truncate, with 4 awns, much longer than calyx-limb, and 4 intermediate, half or less than half as long — Spring — Fields ; common throughout.

FIG. 228.

Head of C. Syriaca.

Var. **Boissieri,** Reut. Heads .02 to .03 long. Longer flowerets overtopping awns of pales — Huleh ; Beirût ; Aintâb.

Var. **sessilis,** Boiss. Plant lower, and spreading more than in type. Leaves often dentate only at middle of margins. Alar flowers all sessile or nearly so. Heads often not more than .01 long — Common.

* * *Perennials.*

† *Hairs stellate-scurfy. Flowers yellow.*

5. C. stellipilis, Boiss. ♃ .2 to .6, woolly-canescent ; stems numerous, wand-like, sparingly branched. Lower leaves oblong-spath-

ulate, upper-linear, all entire. Heads round-ovate, .015 long, very long peduncled ; the tomentellous, pale bracts and lower pales ovate, unarmed, the others tapering, prickly-tipped ; involucel hirsute, with 4, lanceolate, ciliate awns, as long as tube, and 4, intermediate, very short ones — July to October — Subalpine Lebanon, Antilebanon, and northward.

† † *Hairs simple. Flowers yellow.*

‡ *All the leaves undivided.*

6. C. salicifolia, Post. (Bull. Soc., Vaud. Sc., Nat. xxiv., 100) ♃ .5 to .6 ; stems wand-like, minutely velvety. Leaves *glabrescent, coriaceous, netted-wrinkled*, those of stem oblanceolate to linear, acute, the lower tapering to a petiole, the upper sessile. Heads long-peduncled, .015 long ; the broad-ovate, *obtuse* scales of involucre and the oblong-pales, *abruptly mucronate ;* involucel quadrangular, hirsute, with 4 awns as long as involucel, nearly concealed by bristles — June — Aintâb.

‡ ‡ *Only lowest leaves undivided. The others lyrate or pinnatisect.*

7. C. ambrosioides, Sibth. ♃ 1 to 2 ; stem stout, branching, 3-7-headed. Leaves more or less tomentellous, pinnatisect, the lower with 3-7 pairs of *ovate or elliptical-oblong, coarse-toothed, and cut, cuneate lobes ;* the upper with lanceolate to linear lobes. Heads long-peduncled, globular, .02 to .03 in diameter ; bracts pale, tomentellous, ovate-triangular ; pales lanceolate, acuminate, prickly-tipped ; involucel hirsute, the four longer teeth one-third as long as tube, once and a half as long as boss of calyx-limb ; the four intermediate very-short — August to October — Middle mountain zone ; Lebanon ; Amanus.

Var. **augustifolia,** Post. Lobes of leaves linear-lanceolate to linear — Amanus.

8. C. dipsacoides, Boiss. et Bal. ♃ 1 to 2 ; stem branching, 3-7-headed. Upper root- and lower stem-leaves soft woolly, *lyrate, lateral lobes* 1-3 *pairs, oblong, obtuse, small*, terminal oblong-ovate, crenate-toothed ; upper leaves pinnatisect into linear leaflets. Heads round-ovate, .02 long, long-peduncled ; bracts ovate, pale, the outer muticous, the inner and pales short-mucronate ; involucel hirsute, with 4, short awns at angles, as long as stalk of calyx-limb, and one-fourth to one-sixth as long as involucel tube, and twice as long as the 4 intermediate awns — August to October.

Var. **Libanotica,** Boiss. Heads somewhat smaller. Pales oblong-lanceolate — Subalpine Lebanon.

4. KNAUTIA, Coult. Knautia.

Involucel flattened, with denticulate limb. Calyx-limb unequally 6-8-dentate. Corolla 4-5-fid. Receptacle naked or hirsute — Perennial or (ours) annual herbs, with leafy involucre.

Fig. 229.



(*a*) Fruit of K. hybrida. (*b*) Fruit of var. bidens. Magnified 4 diameters.

K. hybrida, All. ⊙ .3 to .8, branching, viscid tomentellous, with bristles intermixed. Leaves lyrate-pinnatipartite to oblong, crenate-dentate, or linear, entire. Leaves of involucre shorter than bluish-white flowers, longer than fruit ; teeth of involucel short, *nearly equal ;* calyx-

limb short, bristly — Spring — Fields and rocks ; common.

Var. **bidens,** Post. Teeth of angles of involucel *much longer than the rest* — Ain-el-Ḥarâmîyah, between Tripoli and Hums. (*K. bidens, Sibth.)*

5. SCABIOSA, L. Scabious.

Involucel 8-pitted or grooved, ending in a bell-shaped or rotate, scarious crown. Calyx-limb patelliform, stipitate or nearly sessile, ending in 5 awns. Corolla 5-fid. Receptacle chaffy — Herbs or shrubby plants, with capitate flowers, and many leaved involucre.

* *Whole length of tube of involucel deeply 8-grooved ; nerves of crown more numerous than ribs. Perennials.*

1. S. ochroleuca, L. ♃ .3 to .5, more or less pubescent. Lower leaves oblong, tapering to a petiole, crenate, or lyrate, the others 1-2-pinnatisect or -partite into oblong to linear lobes. Leaves of involucre lanceolate, shorter than flowers ; fruiting heads spherical or ovate, .014 broad (with awns) ; awns of calyx 3-4 times as long as limb — August to October.

Var. **Webbiana,** Boiss. Lower leaves canescent-villous, upper pubescent or glabrous — Alpine regions of Lebanon to Amanus, and northward.

Var. **intermedia,** Post. (Journal Linn. Soc., London, Bot. xxiv., 433). Indument almost pannous. Lower leaves oblong, obsoletely crenate, the base tapering to a long, margined petiole, the upper more or less lyrate-pinnatipartite into wedge-oblong, crenate segments, the lateral segments much smaller than the terminal. Flowers blue or reddish — September and October — Rocky places, Amanus. This variety is quite intermediate between S. ochroleuca, L., and S. Taygetea, Boiss. et Held., and establishes the unity of the two species.

* * *Whole length of tube of involucel 8-ribbed. Nerves of crown continuous with ribs, prominent, meeting in loops at edge. Annuals.*

2. S. arenaria, Forsk. ⊙ .2 to .3, puberulent-scabrous. Root-leaves oblong, *pinnatipartite or cut into oblong-linear lobes ; lobes of upper leaves filiform.* Leaves of involucre *shorter* than head ; corollas white, radiating ; tube of involucel short, ribs and margin of crown ciliate ; awns of calyx 5, *twice as long as crown* — Spring — Borders of Et-Tîh, and southward.

3. S. eremophila, Boiss. ⊙ .05 to .1, puberulent. Root-leaves oblong-linear, entire or pinnatifid at base, *upper linear, entire.* Leaves of involucre longer than head ; corollas flesh-colored, not radiating ; tube of involucel hemispherical, puberulent ; margin of crown ciliate ; awns of calyx 2-6, *as long as or shorter than crown* — Spring — Borders of et-Tîh, and southward.

* * * *Tube of involucel not ribbed below, deeply 8-pitted above.*

† *Biennials to perennials.*

4. S. Ucranica, L. ② to ♃ .5 to .8, di-trivaricately branching, branches sparingly hairy. Leaves pilose or appressed canescent, 1-2-pinnatipartite into oblong to linear lobes, upper often linear, undivided. Leaves of involucre as long as or longer than heads ; corollas

white to yellowish, pinkish, or bluish, radiating ; tube of involucel bristly, somewhat shorter than oblong pits ; crown 20-24-nerved, denticulate ; awns 3-4 times as long as crown — May to September — Lower to subalpine regions of mountains.

† † *Annuals.*

5. **S. Olivieri,** Coult. ⊙ Appressed-hairy, canescent, branching from neck ; branches *slender, wand-like.* Leaves linear-oblong, obtuse, undivided or upper with a lobule at base. *Heads small, few-flowered ;* leaves of involucre ovate-oblong, half as long as flowers ; corollas *purplish ;* tube of involucel small, hemispherical, appressed-hairy, shorter than triangular pits ; crown 20-24-nerved ; awns many times as long as crown — Spring — Et-Tîh, and north-eastward.

6. **S. Sicula,** L. ⊙ Low, pubescent ; stem wand-like, divaricately branched. Lower leaves oblong or lyrate, upper pinnatipartite into linear-lanceolate lobes, the terminal much longer. Heads *few-flowered ;* leaves of involucre linear, at length spreading-recurved or deflexed, *longer* than round-ovate, fruiting head ; corollas *red, tubular ;* tube of involucel urn-shaped, hairy, about as long as deep, ovate pits ; crown 20-24-nerved ; awns many times as long as crown — Spring — Fields ; Cœlesyria to Aleppo, and northward, and eastward.

7. **S. prolifera,** L. ⊙ .3 to .6, appressed hirsute ; stem stout, forked or whorled. Leaves oblong to oblong-lanceolate and linear. Heads *sessile or short-peduncled,* .03 to .04 broad ; leaves of involucre lanceolate, shorter than *cream-colored, radiating* corollas ; fruiting heads globular, .03 to .04 broad ; tube of involucel obconical, hirsute, as long as obovate pits ; crown rusty-colored, 30-34-nerved ; *awns shorter than crown* — Spring — Fields ; common.

Fig. 230.



Involucel and crown of S. prolifera.

8. **S. Palæstina,** L. ⊙ .4 to .8, more or less pubescent ; stems 2-3-chotomously branched above. Leaves oblong to linear, entire, or more or less lyrate-pinnatipartite. Leaves of involucre oblong-lanceolate, usually shorter than cream-colored to bluish, radiating corollas ; tube of involucel pilose, shorter than obtriangular pits ; crown rust-colored, 30-35-nerved ; *awns included, or slightly exserted* — Spring — Common in fields ; very variable.

Var. **genuina,** Boiss. Lower leaves oblong, coarsely toothed ; upper lyrate, or 3-5-parted into lanceolate lobes, the terminal larger. Leaves of involucre about as long as cream-colored, 3-4-fid corollas ; awns included — Common throughout, especially southward.

Var. **latiloba,** Boiss. Leaves lyrate, terminal lobe oblong-lanceolate, lateral 1-2 pairs, *minute.* Heads .015 to .02 broad ; involucre shorter than pinkish-blue, radiating flowers ; awns *exserted* — Jerusalem ; Lebanon ; Marash.

Var. **calocephala,** Boiss. Lower leaves oblong to oblong-lanceolate, dentate, or rarely pinnatifid ; upper lyrate-pinnatipartite. Heads .03 to .04 broad ; involucre shorter than *showy,* blue or pinkish-blue, 4-6-*lobed* corollas ; awns *exserted* — Aleppo to Aintâb, and northward.

Var. **microcephala,** Boiss. Slender. Lower leaves lanceolate, nearly entire, upper pinnatipartite at base. *Flowering heads* .01 broad ; involucre nearly as long as lilac, short-radiating corollas ; awn somewhat exserted — Coast to Cœlesyria, Damascus, and northward.

9. S. Aucheri, Boiss. ⊙ .02 to .1, pubescent ; stems simple or branching. Leaves linear-lanceolate, lower undivided, upper with a pair of small lobes at base. Involucre longer than *flesh-colored* flowers ; tube of involucel hairy, shorter than pits ; crown 20-24-nerved ; awns *included* — Spring — Jerusalem to Antilebanon, Damascus, Palmyra, Aleppo, and eastward.

10. L. rotata, M.B. .1 to .2, pubescent ; stems simple or branching. Leaves oblong-lanceolate to linear, lower undivided, upper with 1-2 pairs of minute lobes at base. Involucre longer than *reddish* flowers ; tube of involucel hairy, scarcely shorter than pits ; crown 30-36-nerved ; awns *exserted* — Spring — Aintâb to Marash, and northward, and eastward.

Var. **Persica,** Boiss. Slender. All the leaves pinnately divided into oblong-linear and linear lobes. Heads .01 to .02 in diameter ; flowers radiating ; awns exserted — Aintâb, northward, and eastward.

6. PTEROCEPHALUS, Vaill. Pterocephalus.

Tube of involucel 8-grooved or striate, ending in minute teeth or a short crown. Calyx-limb short-stipitate, with 12-24, plumose awns. Corolla 5-fid. Receptacle hairy or naked — Herbs or shrubs.

* *Annuals. Flowers pink, blue, or purple.*

1. P. plumosus, L. ⊙ .3 to .8, viscid-pubescent, branching above. Lower leaves oblong-elliptical, crenate-dentate, *undivided or lyrate*, upper *pinnatipartite into linear-lanceolate to linear lobes, the terminal lobe* much larger. Involucre as long as or longer than pink or lilac flowers ; involucel truncate-denticulate ; awns 11-12, scarcely twice as long as tube — Spring — Rocky hills ; common along coast, and in lower mountains and interior plains.

2. P. involucratus, S. et S. ⊙ .15 to .4, pubescent and hairy, viscid ; stems forked, much branched. Leaves *pinnatisect into oblong-linear, pinnatifid, decurrent lobes.* Involucre as long as or longer than pink to blackish-purple flowers, larger leaves 2-4-lobed at base ; involucel truncate, ending in a small, membranous crown ; awns 12, once and a half as long as tube — Spring — Dry hills ; same range as last, but rarer.

* * *Shrubby perennials.*

† *Flowers pink, scarcely radiating.*

3. P. sanctus, Decaisn. ♄ *Samma.* .3, pubescent-viscid ; branches 1-5-headed. Leaves .025 long, obovate-dentate to lyrate-pinnatipartite, with short, obtusely dentate lobes, the terminal longer than the others. Crown of involucel hairy, short, crenate ; awns 20-24 — Spring — Sinai.

† † *Flowers yellow.*

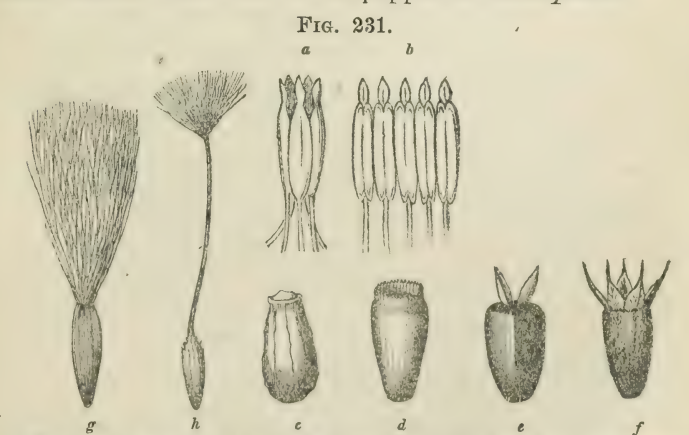
4. P. Arabicus, Boiss. .04 to .1, shrubby, crisp-appressed-canescent ; branches 1-3-headed. Leaves linear-lanceolate in outline, .02 to .03 long, .003 to .006 broad, *dentate or pinnatifid to middle, with short triangular lobes.* Involucre *as long as or longer than* flowers ; *crown of involucel entire ;* awns 16 —Spring—Tîh escarpment.

5. P. pulverulentus, Boiss. et Bl. ♃ .3 to .5, shrubby at base, crisp-tomentellous, whitish; branches 3-5-headed. Leaves lanceolate in outline, .03 to .06 long, .005 to .01 broad, *pinnatipartite into short, ovate-oblong, denticulate or entire lobes.* Involucre a little shorter than flowers ; crown of involucel short, crisp-hairy ; awns 16 or less — Spring — Ḥaurân ; Snoû Fâdil to Palmyra, and eastward to Mesopotamia.

ORDER LVI. COMPOSITÆ, Vaill. (COMPOSITE FAMILY).

Flowerets in a close head (compound flower) upon a common receptacle, surrounded by an involucre, with 5 *(rarely* 4*) stamens inserted on the corolla, the anthers united in a tube (syngenesious)* — Flowerets perfect, or by abortion imperfect. Receptacle naked, bristly, or chaffy ; involucre usually of many scales. Calyx-tube united with the 1-celled ovary, the limb *(pappus)* 0, or consisting of *teeth, bristles, awns, scales, or a cup.* Corolla gamopetalous, inserted on the calyx-tube, *strap-shaped* or *tubular*, the tubular with a 4-5 rarely 2-3-lobed limb. Stamens alternate with corolla-lobes ; anthers usually appendaged at tip. Styles 2-cleft at tip. Fruit an *akene*, containing a single, anatropous seed, with no albumen. An immense order, chiefly herbs. The strap-shaped or ligulate flowerets are called *rays*, and a head containing such flowers is called *radiate.* The tubular flowerets compose the *disk*, and a head with no ray flowers is called *discoid.* The leaves or parts of the involucre are called *scales.* The chaff of the pappus is called *pales.*

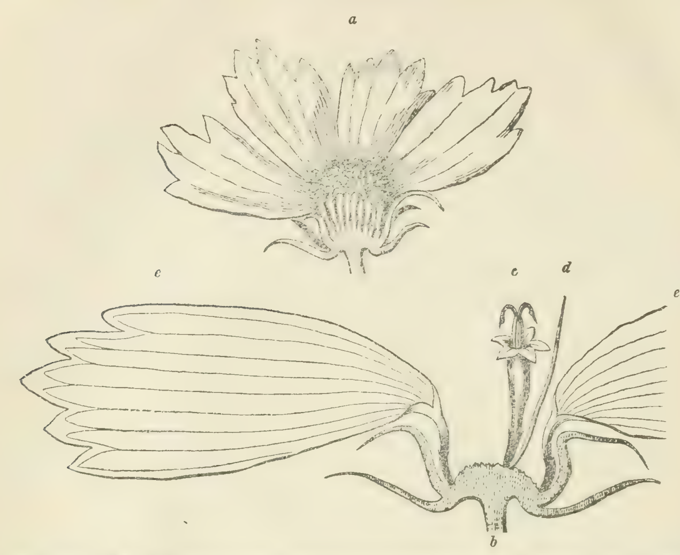
FIG. 231.



(*a*) Syngenesious stamens of a composite floweret. (*b*) The same split and unfolded, showing the coherent anthers, with their appendages, and free filaments. (*c*) Fruit of a floweret, destitute of calyx-margin. (*d-f*) Fruits with calyx margin, (*d*) cup-shaped, (*e*) of two pales, (*f*) of five pales, (*g*) of many awns or bristles inserted at apex of fruit, (*h*) of many bristles inserted at apex of a beak.

SUBORDER I. **TUBULIFLORÆ.** Flowerets all tubular, or the marginal ones only ligulate or strap-shaped.

FIG. 232.



(*a*) A head of the Tubulifloræ cut across showing the involucre, the disk, and the disk-flowerets, which are all tubular, except those at the margin, these being strap-shaped. (*b*) The same enlarged and stripped of all except one of the disk flowerets and two of the ray-flowerets. (*c*) A tubular floweret, with a toothed calyx and (*d*) a bristle at its base inserted into the disk. (*ee*) Two of the ray-flowerets, with strap-shaped corollas.

§ 1. *Heads discoid.*

* *Flowers of the head all, or nearly all perfect.*

† *Pappus composed of awns, or bristles, or hairs.*

‡ *Pappus in one row or nearly so.*

Receptacle naked.
  Scales few - - - - - - - Eupatorium 1
  Scales many, commonly colored - - Helichrysum 13
Receptacle honey-combed - - - - Varthemia 17
Receptacle bristly - - - - Ptosimopappus 7
Receptacle chaffy.
  Pappus in one row, short - - - Chrysophthalmum 24
  Pappus of 2-4 beards - - - - Bidens 29

‡ ‡ *Pappus in two or more rows.*

Bristles of pappus united in a ring at base.
  Receptacle thickly clothed with awns or bristles.
    Pappus scabrous.
      Filaments free. Margins of scales unarmed - Carduus 58
      Filaments monadelphous. Margins of scales prickly. Silybum 64
    Pappus feathery.
      Akenes with apex more or less margined.

Herbs with spiny-toothed and lobed leaves Cirsium 59
Herbs, woody at base, with unarmed leaves Jurinea 67
Akenes scarcely margined at apex.
Tall herbs, with large, pinnatisect leaves - Cynara 63
Shrubby plants, hanging from rocks, with linear, entire leaves Chamæpeuce 61
Receptacle honey-combed - - - - - Onopordon 62
Bristles of pappus not united in a ring at base, or slightly so.
Receptacle clothed with awns or bristles.
Bristles of pappus about of equal length.
Scabrous. Plants not spiny - - - Lappa 56
Scabrous. Plants spiny - - - Cousinia 57
Plumose - - - - - - - - Carduncellus 78
Bristles of pappus unequal, the outer shorter.
Akenes somewhat 4-angled.
Stemless herbs with rosetted leaves Rhaponticum 74
Herbs with leafy stems and branches Carthamus 77
Akenes oval or terete - - - - - Serratula 68
Akenes somewhat flattened, 4-angled, slightly margined Phæopappus 75
Receptacle honey-combed - - - - - Iphiona 16

† † *Pappus composed of awns or bristles, and chaff.*

Inner pappus of short pales, connivent at tip Centaurea 72

† † † *Pappus all of pales, which are sometimes cleft or fringed.*

Pales fringed into plumose hairs - - - Carlina 54
Pales 10, ending in barbellate bristles - Hochstetteria 79
Pales in 1-2 rows, needle-pointed - - Cardopatium 50
Pales fringed into barbellate bristles - - Stæhelina 66
Pales in several rows, the inner longer - Carthamus 77
Pales in several rows, the inner shorter. Carthamus 77, Centaurea 72

† † † † *Pappus crown-like or cup-like.*

Heads large, ovoid, composed of few-flowered headlets Gundelia 47
Heads spherical, composed of 1-flowered headlets.
Tall, spiny-leaved perennials, with spherical, spiny heads Echinops 46
Low, sparingly prickly-leaved annuals, with hemispherical heads Acantholepis 49

† † † † † *Pappus consisting of auricles, adnate to corolla tube.*

White-pannous, maritime perennials - - Diotis 32

† † † † † † *Pappus none.*

Receptacle naked or bristly.
Plants with or without woody base. Akenes obovate Artemisia 40
Plants not woody at base. Akenes obovate-oblong Brocchia 39
Receptacle chaffy - - - - - - Anvillæa 21
Receptacle hairy - - - - - - Carthamus 77

* * *Flowers not all perfect.*

Marginal flowerets pistillate, central perfect.
  Receptacle chaffy, at least at edge.
    Pappus composed of scabrous bristles - Filago 8
    Pappus plumose - - - - - - Ifloga 9
    Pappus none - - - - - - Achillæa 31
    Pappus of 1-3 or 10 pales. Scales unarmed Chardinia 52
    Pappus of 8-10 pales. Scales spiny-tipped Siebera 53
Receptacle naked or covered with papillæ or bristles.
  Pappus composed of scabrous awns or bristles.
    Plants with a woody base.
      Shrubs, 1 or more high ; leaves green ; heads corymbose Conyza 5
      Herbs, .2 to .5, growing in crevices of rocks ; heads solitary Phagnalon 11
      Canescent herbs or small shrubs - - Helichrysum 13
    Plants not woody at base - - - - Gnaphalium 12
  Pappus plumose. Dwarf desert plants - Lasiopogon 10
  Pappus none. Plants shrubby at base - - Artemisia 40
Marginal flowerets pistillate, central staminate.
  Pappus scabrous ; some of the akenes 2-horned Dipterocome 45
  Pappus of bristles and pales - - - Gymnarrhena 20
  Pappus none.
    Outer flowerets in several rows - - - Evax 6
    Outer flowerets in one row - - - Micropus 7
Marginal flowerets neutral, central perfect.
  Receptacle chaffy - - - - - - Xeranthemum 51
  Receptacle clothed with fringed bristles.
    Filaments free.
      Pappus composed of bristles united in a ring at base Notobasis 60
      Pappus composed of bristles not united at base Phæopappus 75
      Outer pappus bristles, inner connivent pales Centaurea 72
      Outer pappus 10 awns, inner 10 bristles Cnicus 73
      Outer pappus in ∞ rows of barbellate bristles, inner 5-10 pales Crupina 69
    Filaments monadelphous - - - - Tyrimnus 65

*** *Heads monœcious.*

Involucre of scales grown together, covered with hooked prickles Xanthium 27
Involucre of unarmed heads not more than .003 broad Ambrosia 26

§ 2. *Heads discoid or radiate.*

Receptacle naked.
  Pappus hairy, about 1-rowed - - - Erigeron 4
  Pappus hairy, in more than 1 row - - - Senecio 43
  Pappus crown-like or 0.
    Annuals or perennials. Akenes obpyramidal, Chamæmelum 34
    Annuals. Fragrant. Akenes nearly terete, back smooth Matricaria 38
    Perennials. Akenes equally ribbed, prismatic Pyrethrum 37
Receptacle chaffy.
  Pappus consisting of plumose pales - - Atractylis 55

Pappus in the form of an auricle or crown.
Akenes with a broad pellucid wing on either side - Anacyclus 30
Akenes pyramidal-angled or compressed-tetragonal - Anthemis 33
Pappus composed of both bristles and pales - Postia 25
Pappus 0.
Heads not more than .005 broad - - Achillæa 31
Heads always more than .005 broad, usually much broader - Anthemis 33

§ 3. *Heads radiate.*

Receptacle naked, or chaffy near margin only.
Pappus composed of bristles.
In more than one row, uniform - - - Senecio 43
In one row, uniform.
Anthers entire at base - - - - Solidago 2
Anthers sagittate at base - - - Inula 15
Of the rays in ∞ rows, of the disk in 1 - Tussilago 41
Outer of pales, inner of plumose bristles - Leyssera 14
Outer of crown-like, toothed bristles, inner delicate - Pulicaria 18
Outer of crown-like toothed bristles, inner thickened - Francœria 19
Pappus crown-like or 0.
Akenes obovate-compressed - - - Bellis 3
Akenes of the rays triquetrous, of the disk turbinate - Chrysanthemum 36
Akenes curved, ring-like or inflated - - Calendula 44
Akenes 3-winged, 3-angled, tipped with a wing. - Tripteris 46
Receptacle chaffy.
Pappus crown-like.
Akenes uniform, turbinate, not winged - Asteriscus 22
Akenes of rays triquetrous, 2-winged - Pallenis 23
Pappus 0.
Akenes tubercled, truncate at tip, hairy - Eclipta 28
Akenes tapering at base, broad at tip - Achillæa 31
Akenes obovate, rounded at tip, 3-ribbed at face. - Ormenis 35
Receptacle hirsute. Pappus hairy or 0. - - Doronicum 42
Receptacle bristly. Pappus of pales or bristles.
Pappus composed only of pales - - - Amberboa 70
Pappus composed of bristles and pales.
Tip of akene marked by 3 grooves - - Zoegea 71
Tip of akene marked by 1 groove - - Centaurea 72

SUBORDER II. **LIGULIFLORÆ.** Flowerets all ligulate (strap-shaped), perfect,

FIG. 233.



(a) A compound flower of Cichorium, belonging to the Liguliforæ, wide open, showing that all the flowerets are strap-shaped. (b) Another of the same before opening showing the involucre. (c) A compound flower laid open to show the involucre and strap-shaped flowerets with their exserted, syngenesious anthers, and bifid styles.

* *Receptacle chaffy.*

Pappus crown-like ; border crenate, muticous, or 2-awned	Scolymus	80
Pappus plumose - - - - - -	Hypochæris	100
Pappus hairy ; akenes beaked - - -	Rodigia	91

* * *Receptacle bristly or hairy.*

Pappus chaffy - - - - - -	Catenanche	81
Pappus hairy or bristly - - - - -	Lagoseris	96

* * * *Receptacle bristly, sometimes chaffy at margin.*

Pappus of scabrous bristles, plumose at base -	Andryala	99

* * * * *Receptacle naked.*

Pappus of pales, or pales and bristles, or cup-like, not plumose.

Akenes obovate or ob-pyramidal - -	Cichorium	82

Akenes compressed or angular-cylindrical - Hyoseris 83
Akenes teretish; pappus of outer cup-like, of inner awned pales Hedypnois 84
Pappus bristly-hairy, not plumose or 0.
Akenes bald, awl-shaped - - - - Rhagadiolus 88
Akenes all or marginal ones with a short crown.
Akenes 4-angled - - - - - Tolpis 85
Akenes compressed, about 20-striate - Lapsana 86
Akenes hook-shaped - - - - Garhadiolus 89
Akenes with barbed prickles, the terminal recurved. Kœlpinia 87
Akenes all with pappus.
Akenes with a hollow stalk, not beaked - Scorzonera 113
Akenes not stalked.
Akenes 4-angled, not beaked - - Tolpis 85
Akenes of margin 4-5-angled, not beaked; pappus united at base Picridium 107
Akenes cylindrical or prismatic, not beaked.
Pappus white, soft (in 97 outer akenes bald).
Akenes 10-30-striate, similar - - Crepis 95
Akenes not striate, the inner white Zollikoferia 109
Akenes striate, the inner with a hollow base Cymboseris 97
Pappus rusty or reddish - - - Hieracium 98
Akenes more or less flattened, not beaked Sonchus 108
Akenes of the margin only beaked - Zacyntha 90
Akenes of the disk at least beaked - Crepis 95
Akenes all beaked.
10-30 striate; pappus white, soft - Crepis 95
compressed; pappus on a disk at tip of beak Lactuca 105
terete; pappus on disk at tip of beak. Cephalorrhynchus 106
4-angled; beak pyramidal at base - Taraxacum 103
5-angled, tipped with crown-like scales and beak Chondrilla 104
Pappus plumose.
Hairs of plumes not interlaced.
Akenes muricate-wrinkled, outer beakless, inner beaked Thrincia 102
Akenes muricate-lamellate, jointed with beak Urospermum 112
Akenes transversely wrinkled.
Pappus in 1-2 rows, united in a ring or cup below Picris 92
Pappus of disk akenes of 5 pales, of margin cup-like Hagioseris 93
Pappus in 1 row of bristles at tip of slender beak Helminthia 94
Akenes finely striate. Pappus in 1-several rows, dilated at base Leontodon 101
Hairs of plumes interlaced.
Pappus of marginal akenes chaffy, scabrous Geropogon 111
Pappus of all the akenes bristly, plumose.
Involucre in 1 row of 5-16, nearly equal scales Tragopogon 110
Involucre in several rows of unequal scales (except S. lanata) Scorzonera 113

1. EUPATORIUM, L. Thoroughwort. Boneset.

Heads discoid. Flowers all perfect, funnel-shaped. Involucre cylindrical, more or less imbricated. Receptacle naked. Branches of style long, terete. Akenes ribbed. Pappus a single row of hairs — Perennial herbs, woody at base, with purplish flowers and opposite leaves.

E. cannabinum, L. ♃ 1 or more, puberulent ; branches few, opposite. Leaves often ternate ; leaflets lanceolate, tapering at base, serrate, Heads 5-6-flowered ; scales of involucre about 10, nearly in two rows, oblong, obtuse, the outer much shorter — July to September — Ditches and banks of streams ; common to subalpine regions.

Var. **Syriacum,** Jacq. Leaflets ovate-lanceolate to ovate, short-tapering at base — Common.

Var. **indivisum,** Boiss. Leaves all undivided, ovate-oblong, short-tapering or rounded at base.— Less common.

2. SOLIDAGO, L. Golden-Rod.

Heads radiate. Rays of one color, in one row, pistillate. Disk-flowerets perfect, 5-toothed. Involucre imbricated. Receptacle naked. Akenes beakless, nearly terete. Pappus consisting of a single row of scabrous bristles — Perennial herbs, with yellow, radiate flowers.

S. Virga-aurea, L. ♃ .6 to 1, or more ; stem terete, erect, ending in a naked or leafy panicle. Leaves ovate to oblong-lanceolate and lanceolate, acute to acuminate, the lower serrate. Heads .01 long ; scales of involucre unequal, loose, lanceolate to linear ; rays 8-9, elliptical-oblong, once and a half to twice as long as involucre — August to October — Woods of subalpine Lebanon, Antilebanon, and Amanus, and northward.

3. BELLIS, L. Daisy. *Iqḥauwân.*

Heads radiate, rays in one row, strap-shaped, white to pink or variegated, pistillate ; disk flowerets tubular, perfect. Scales of involucre in one or two rows, leaf-like. Receptacle naked, conical, akenes flattened, obovate, destitute of pappus — Low, annual or perennial herbs, with solitary flowers.

* *Leaves rosetted at base. Flowers* .02 *to* .03 *broad, on scape-like peduncles.*

1. B. perennis, L. ♃ .2 to .3, more or less appressed papillose-hairy. Leaves obovate-spathulate, *more or less abruptly* tapering into a petiole, 1-*nerved*, entire or somewhat crenate. Scales of involucre oblong, obtuse — Throughout the year — Common except in alpine regions and deserts.

2. B. sylvestris, Cyr. ♃ .2 to .3, more or less white-papillose. Leaves oblong-spathulate, *gradually* tapering to a petiole, 3-*nerved*, entire or denticulate. Scales of involucre oblong-lanceolate, sometimes acutish — Throughout the year — Common except in Alpine regions and deserts.

* * *Stem leafy, rarely scape-like. Flowers* .005 *to* .015 *broad.*

3. B. annua, L. ⊙ .05 to .1, sparingly hairy ; stems simple or slightly branched. Lower leaves obovate-spathulate, abruptly taper-

ing into a broad petiole, coarse-dentate or crenate, upper smaller. Scales of involucre elliptical, obtuse — Spring — Coast.

4. ERIGERON, L. Fleabane. *Irîgharûn.*

Heads radiate or discoid. Pistillate flowers strap-shaped, in several rows, and variously tinted, or the inner and sometimes all filiform, truncate, 2-3-toothed. Disk flowers perfect, 5-toothed. Involucre imbricated. Akenes beakless, more or less flattened. Pappus composed of one, rarely two rows of scabrous bristles — Herbs, sometimes woody at base, of various habit.

* *Pistillate flowers all strap-shaped. Pappus in* 1 *row.*

1 E. Canadense, 2 uniflorum.

* * *Outer pistillate flowers strap-shaped, inner filiform. Pappus in* 1 *row.*

3 E. alpinum.

* * * *Pistillate flowers all filiform, in* 1-∞ *rows. Pappus in* 2-1 *row.*

† *Perennials.*

4 E. Bovei, 5 trilobum.

† † *Monocarpic plants.*

6 E. linifolium, 7 Ægyptiacum, 8 Aucheri, 9 setiferum.

1. E. Canadense, L. ⊙ Horseweed. Butterweed. ⊙ .5 to 1, sparingly bristly ; stem erect, leafy, ending in a dense panicle. Leaves linear-lanceolate, entire or sparingly dentate. Heads .004 long ; scales of involucre loose, linear-lanceolate, acuminate ; rays pale pink, erect, scarcely longer than involucre — Summer — A common and deleterious weed of the coast, and lower coast ranges.

2. E. uniflorum, L. ♃ .05 to .1, tufted, hairy; stems 1- rarely 2-3-headed. Root-leaves spathulate, obtuse, tapering into a petiole ; stem-leaves lanceolate, acute, Heads .01 to .015 broad ; scales of involucre lanceolate, tapering ; rays white or pale pink, once and a half as long as involucre — August and September — Alpine Lebanon, above the "Cedars."

3. E. alpinum, L. ♃ .1 to .3, many-stemmed, hirsute. Lower leaves oblong-spathulate, tapering into a petiole ; stem-leaves sessile, linear-lanceolate. Heads solitary, or 3-5, .015 to .02 broad ; scales of involucre linear-lanceolate, acuminate ; rays purple, rarely white, once and a half as long as involucre — August and September — Alpine Lebanon above the "Cedars."

4. E. Bovei, D.C. ♃ *Ghazâni. Belleikh.* .3 to 2, *glabrous ;* stems woody below, erect, leafy, corymbose, few-flowered. Leaves sessile, linear-lanceolate, acute, remotely denticulate or wavy-margined, the upper half-clasping at base. Peduncles rather long, nearly naked ; heads .006 broad ; scales of involucre short, somewhat speading, the rest appressed, linear, acuminate, scarious except the nerve, about as long as pappus ; pistillate flowers numerous — April to July — Callirrhoë to Ghor-es-Safiyeh, Sinai, and southward, and westward.

5. E. trilobum, Decaisne. ♃ *Nefleh. Qurad.* .2 to .4, *setulose-scabrous ;* stems woody below, leafy, corymbose above. Leaves small, tapering into a petiole, the lower obovate-spathulate, with 3-5 obtuse

teeth toward the tip, *those of stem 3-5-lobed or parted into obovate, obtuse lobes, the terminal larger.* Peduncles slender, 2-3 times as long as the .003 broad head ; scales of involucre oblong-linear, acuminate, about as long as pappus, scarious-margined — March to May — Rocks ; el-'Arabah to Sinai.

6. E. linifolium, Willd. ⊙ *Hashîsh-el-Jebel.* .4 to 1. densely *appressed-bristly,* erect, densely leafy, ending in an oblong, many-headed raceme or panicle. Lower leaves lanceolate few-toothed, the rest linear, sessile, acuminate. Heads .006 to .008 broad ; scales of involucre in 1 row, linear, acuminate, considerably shorter than the pappus ; pistillate flowerets in several rows — Summer — Coast of Syria, and lower zone of Lebanon.

7. E. Ægyptiacum, L. ⊙ *Dimsîs. Nukhkhadh-ed-Dubbân.* Villous ; stems erect, loosely corymbose. Leaves *oblong-spathulate,* lobes obtusely coarse-toothed. Scales of involucre nearly in 1 row, linear-acuminate, rough-hairy at back, scarious at margin, shorter than pappus ; pistillate flowers in several rows — April to June — Lower Jordan Valley.

8. E. Aucheri, D.C. ② .3 to .6, pubescent ; stem erect, grooved, rigid, branching from the middle, corymbose above. Leaves oblong-spathulate, tapering into a petiole, margin acutly dentate or wavy. Scales of involucre rough-hairy and pruinose, in about 2 rows, linear, acute, shorter than pappus ; *pistillate flowers few* — Summer — Rivulets and bushy places, Marash, and northward.

9. E. setiferum, Post, (Supplement. Fl. Or. p. 289) ① ② 1 to 2, sparingly *bristly ;* stem striate, *much-branched into a stiff panicle* .4 to .5 long. Leaves linear, *scabrous-prickly at margin,* tapering at both ends, those of branches subulate. Heads dense, .003 long, rather shorter than filiform pedicels ; scales of involucre linear, obtuse, white-margined, in several rows, the inner a little shorter than pappus ; pistillate flowerets few, filiform — August and September — In swamps at Syrian Gates, north of Alexandretta.

5. CONYZA, D. Conyza.

Heads discoid, heterogamous, the marginal flowerets pistillate, filiform, truncate, in many rows, the central perfect, frequently few. Involucre imbricated, scarious. Receptacle naked. Tips of anthers short and narrow. Style of pistillate flowerets glabrous, of perfect hispidulous. Pappus uniform, of few bristles. Akenes somewhat terete — Annual or perennial herbs, with aspect of Erigeron.

C. Dioscoridis, Rauw. ♄ 1 to 3, shrubby, glandular-puberulent, corymbose above. Leaves ovate-oblong, acutish, serrate, lobed at narrow base or undivided ; floral leaves small. Heads .004 long ; scales of involucre ovate to oblong-linear, acute, slightly hairy, the inner acuminate, as long as pappus — March to September — Ditches and banks ; coast ; Jordan Valley and Dead Sea ; Antilebanon.

6. EVAX, Gærtner. Evax.

Heads small, many-flowered, discoid, aggregated in dense clusters. Scales of involucre in about 1 row, scarious, gradually passing into pales on the receptacle. Receptacle conical, naked at tip. Marginal flowerets pistillate, in many rows, filiform, denticulate, eash set in the axil of a bract ; central flowerets few, staminate, 4-toothed. Anthers

caudate at base. Branches of style filiform. Akenes compressed, rarely somewhat terete or oblong, bald — White-woolly herbs, almost stemless.

* *Floral leaves longer than the clusters of heads.*

1. E. pygmæa, L. ⊙ .02 to .04, simple or branching from neck. Leaves spathulate-oblong, obtuse, woolly-canescent. Scales of involucre and pales *glabrescent at back*, ovate, with an abruptly acuminate, spreading tip ; akenes obovate, scabridulous at margin — Spring — Coast.

2. E. contracta, Boiss. ⊙ .05 to .1, stemless, or 1-2-branched from neck. Leaves oblong to spathulate, tapering to a petiole, with dilated sheath. *Woolly* scales of involucre and ovate pales with abruptly acuminate *setaceous* tip. Akenes ovate, pruinose — Spring — Aleppo to Damascus, coast, Wilderness of Judea, and borders of et-Tîh.

3. E. Anatolica, Boiss. et Held. ⊙ .02 to .05, stemless or branching from neck or above. Leaves oblong to linear-lanceolate, acute, 2-3-times as long as cluster. Scales of involucre and pales oblong-spathulate, boat-shaped, narrow at the glabrous base, woolly at the back, tapering abruptly into a short, slender point protruding a little from the wool ; akenes oblong-cylindrical, barely compressed, slightly scabrous — Spring and summer — Common to subalpine regions and in deserts.

** *Floral leaves shorter than clusters, or only as long.*

4. E. eriosphæra, Boiss. et Held. ⊙ .02 to .04, nearly stemless, *tufted.* Leaves linear-spathulate, tongue-shaped, obtuse. Scales of involucre and pales concave, keeled, very woolly ; akenes obovate, scabridulous at margin — Spring — Coast, near Tripoli.

7. MICROPUS, L. Micropus.

Heads small, discoid, few-flowered, clustered. Scales of involucre in 1 row, loose, flat, or obsolete. Receptacle with 1 row of helmet-shaped, laterally flattened pales, enclosing the filiform pistillate flowerets, the centre naked, with few, staminate, tubular, 5-toothed flowerets. Anthers caudate at base. Branches of style filiform. Akenes flattened, obovate, bald — Annual, more or less woolly-canescent herbs.

* *Involucre composed of membranous or leafy scales. Pales unarmed.*

1. M. erectus, L. ⊙ .1 to .2, beset with *short* wool ; stem erect, diffusely branched from neck or above. Leaves sessile, oblong, *wavy-margined*, the floral leaves *overtopping the clusters.* Scales of involucre membranous, oblong-linear, obtuse ; pales leathery, woolly, incurved, gibbous at back, with a small, oblique beak — Spring — Lebanon and Antilebanon ; Ḥaurân.

2. M. bombycinus, Lag. ⊙ .1 to .2, clothed with *long*, white wool *inflated particularly at clusters ;* stem simple or branching. Leaves flat, oblong-linear, *with straight margins*, the floral *not overtopping the clusters.* Scales of involucre membranous, oblong-linear, obtuse : pales leathery, densely woolly, incurved, gibbous at back,

with a small, oblique beak — Spring — Jebel Bil'âs (Syrian desert) ; subalpine Lebanon and Antilebanon ; Damascus. Too near the last.

3. M. longifolius, Boiss. et Reut. ⊙ .1 to .2, clothed with *short* wool inflated at clusters ; branches spreading from neck. Leaves flat, *long*, *linear*, *acutish*, the floral *long overtopping the clusters*. Scales of involucre *leaf-like*, oblong-linear, obtuse ; pales *tender*, densely woolly, *semicircularly curved*, *not gibbous at back*, with a small, terminal beak — Spring — Antilebanon to Damascus, Aleppo, and northward.

* * *Scales of involucre obsolete. Pales echinate at back.*

4. M. supinus, L. ⊙ .1 to .2, *appressed-canescent*, branching from neck, diffuse. Leaves *obovate-spathulate*, tapering at base. Heads *solitary in the axils ;* pales few, *at length woody*, *obtriangular* — Spring — Fields drying up after inundation ; Palestine to Cœlesyria, Antilebanon, Aleppo, and northward.

8. FILAGO, L. Cotton Rose.

Heads small, discoid, clustered. Scales of involucre in 2-5 rows, gradually merging into pales. Receptacle elongated or flat, naked at centre where the perfect flowerets are inserted. Outer flowerets pistillate in 2-several rows, filiform, each in the axil of a bract, with bald akenes, central few, tubular, with a pappus of scabrous bristles — Annual, woolly herbs.

* *Headlets numerous, densely clustered. Receptacle filiform.*

1. F. Germanica, L. ⊙ .2 to .5, grey ; stem simple below or branching from neck, corymbose above. Leaves numerous, erect, oblong to *linear-lanceolate*, *those of stem not tapering at base.* Clusters dense, globular, sessile in the forks or terminal ; headlets 20-30 ; involucre obconical, obtusely pentagonal ; scales erect, loose, lanceolate, with a tapering subulate point.

Var. **eriocephala,** Boiss. Involucre woolly for three-fourths of its length ; scales with shorter points, frequently only acute — Spring — Coast to middle zone of Lebanon ; Moab ; Gilead ; Ḥaurân.

2. F. spathulata, Presl. ⊙ .2 to .4, grey ; stem branching from neck. Leaves *oblong-spathulate.* Clusters dense, in the forks and terminal ; headlets 12-15 ; involucre ovoid, rather sharply pentagonal, scales appressed, oblong, keeled, with a tapering subulate tip, inner scales rather obtuse — Spring — Coast, Lebanon, Cœlesyria, and Antilebanon.

Var. **prostrata,** Boiss. Much branched, prostrate ; clusters numerous, frequently close together. Scales tomentellous except at tip — Sandy places ; coast to Jerusalem, Jordan Valley, Syrian Desert, et-Tih, and southward.

* * *Headlets few, clustered, separated by bracts. Receptacle flat.*

† *Scales of involucre in few rows, alternate, wide open after flowering.*

3. F. arvensis, L. ⊙ .1 to .2, canescent ; stem erect, panicled above or branching from base, branches erect, almost simple, nearly spicate. Leaves oblong to linear-lanceolate, acute, erect. Clusters lateral and terminal ; involucre ovate, outer scales 3-5, concave, herbaceous, inner 8, longer, scarious, somewhat obtuse — Spring — Middle to subalpine Lebanon, Antilebanon, Aintâb, and northward.

Var. **lagopus,** DC. Leaves somewhat broader and looser. Clusters flocculent — Coast.

† † *Scales of involucre in 3 rows, about 5 in a row, opposite.*

4. F. Gallica, L. ⊙ .2, grey ; stem erect, branching above. Leaves *linear-subulate*, the floral overtopping the heads. Heads lateral and terminal ; outer scales of involucre membranous, triangular, acute, the inner lanceolate, obtuse, twice as long — April — Esh-Sha'rah, between Tripoli and Ḥems.

9. IFLOGA, Cass. Ifloga.

Heads many-flowered, discoid. Involucre imbricated, scales numerous, gradually changing into pales. Receptacle elongated, naked at centre. Marginal flowerets pistillate, few, filiform, in axils of pales ; central flowerets tubular, perfect and staminate. Anthers caudate. Branches of style filiform, elongated in the pistillate, very short in the perfect flowers. Akenes of the pistillate flowers bald, of the perfect with 1 row of feathery-tipped pappus — Distinguished from Filago by the feathery tip of the pappus.

I. spicata, Forsk. ⊙ *Kureishat-el-Judai.* .05 to .1 ; stems simple or branching from neck, forming leafy spikes .01 to .04 long. Leaves linear-subulate, protruding from the spike, tomentellous or glabrescent. Heads 2-3 in a cluster; scales of involucre scarious, ovate, tapering into a long point — Spring — Sandy places, coast to Sinai, and southward.

10. LASIOPOGON, Cass. Lasiopogon. *Kureishat-el-Judai.*

Heads many-flowered, discoid, heterogamous. Involucre in 2 rows. Receptacle flat, naked. Outer flowerets in several rows, pistillate, filiform ; central flowerets perfect, tubular, 4-5-toothed. Anthers caudate. Akenes obovate, somewhat compressed, all pappose ; pappus in 1 row — Annual, dwarf, woolly herbs.

L. muscoides, Desf. ⊙ .05 to .1, much branched from base ; branches filiform, prostrate. Leaves linear to oblong-spathulate, the floral about as long as clusters, which are concealed in the fine wool. Scales of involucre scarious, linear, obtuse — March and April — Dry places in Wadis about the Dead Sea.

11. PHAGNALON, Cass. Phagnalon.

Heads discoid. Flowers tubular, the outer in several rows, pistillate, filiform, the inner perfect, tubular, 5-toothed. Involucre imbricated, leathery or scarious. Receptacle naked. Anthers sagittate at base, sometimes not caudate. Akenes beakless, somewhat cylindrical. Pappus uniform, in 1 row, scabrous — Herbs woody at base, heads solitary, on rather long peduncles.

1. Ph. nitidum, Fresen. ♄ *Khamânat-en-Na'jeh*, .15 to .2, stems ascending, simple or sparingly branched. Leaves oblong to linear, acutish, auricled at base. Peduncles terminal ; scales of involucre glabrescent, glossy, scarious, with purplish-brown median nerve, and pellucid, ragged-toothed margin, the outer rounded-ovate, mucronate, the inner lanceolate, larger — May — Sinai.

2. Ph. rupestre, L. ♄ .4 to .6, appressed-canescent ; stems numerous, ascending or erect. Leaves somewhat toothed, often wavy, the lower oblong, tapering at base, the rest oblong-linear, sessile. Peduncles from the upper axils, single or in pairs ; heads .012 long ; scales of involucre glossy, glabrous, very unequal, the lower leathery, ovate to linear, the upper linear, all obtuse — Spring — Rocky places ; common along coast and in lower and middle mountain regions.

3. Ph. Kotschyi, Schultz. ♄ .1 to .25 ; stems appressed-canescent, leafy. Leaves *tender*, *green*, *glabrous*, *oblong to lenticular*, the lower tapering into a petiole, the upper sessile. Peduncles terminal, single or in pairs ; heads .006 to .008 long ; scales of involucre *tender*, lanceolate to linear, *green-vittate*, scarious-margined, the inner subulate-tipped — July to September — Fissures of rocks ; subalpine to alpine Lebanon.

4. Ph. linifolium, Post. ♄ .1 to .25 ; stems woody at base, *minutely papillose or glabrescent*, leafy. Leaves glabrous, *oblong to linear-lanceolate*, acutish, the lower tapering to a petiole, the upper sessile, all sparingly denticulate or entire, with revolute margins. Peduncles terminal, with 1-2 minute bracts, solitary or twin ; heads .008 to .01 long ; scales of involucre glabrous, glossy, *oblong-obtuse to linear-acuminate*, the outer very short, with a sagittate brown mark near tip — April — Rocky places near Deir-'Atîyeh and Qaldûn (Antilebanon).

12. GNAPHALIUM, L. Cudweed.

Heads heterogamous, many-flowered, discoid. Involucre scarious, imbricated. Receptacle flat, naked. Outer flowerets pistillate, filiform, usually in several rows ; central flowerets tubular, perfect. Anthers caudate. Akenes nearly terete or compressed. Pappus in 1 row, scabrous — Annual or perennial, appressed-woolly herbs.

G. luteo-album, L. ⊙ *Ra'ra'. Sabûn 'Afrît.* .1 to .4 ; stem erect, simple or branching, corymbose above. Lower leaves oblong-spathulate, obtuse, upper lanceolate, acute, half-clasping. Heads small, *in cymose, leafless clusters ;* involucre *bell-shaped*, glabrous, pale straw-colored, scales oblong, *obtuse ;* akenes tubercled — Spring and Summer — Sandy places ; common.

13. HELICHRYSUM, DC. Helichrysum.

Heads many-flowered, discoid, usually homogamous. Involucre scarious, imbricated. Receptacle flat, naked. Flowers all tubular, perfect, or rarely the outer row pistillate, slender. Anthers caudate. Akenes nearly terete. Pappus in 1 row, scabrous, frequently somewhat plumose at tip — Woolly, perennial herbs, sometimes woody at base.

* *Scales of involucre erect, little or no longer than flowerets.*

1. H. Siculum, Spreng. ♃ *Bezâz-el-'Adhrâ.* .2 to .4, many-stemmed ; stems slender, simple, erect or decumbent, leafy. Leaves linear, revolute-margined. Corymbs terminal ; heads few, .004 long ; scales of involucre few, *lemon-yellow*, glossy, thin, obtuse, ovate, glabrous at base, the inner linear-spathulate, tomentellous at back — April and May — Coast to middle zone of Lebanon.

2. H. Pallasii, Spreng. ♃ .15 to .25, trunk woody ; stems numerous, erect, leafy. Leaves of suckers linear to oblong-spathulate, of stem linear, acute. Heads 1-5, terminal, .008 to .01 long, long-peduncled, globular, *golden-yellow ;* scales of involucre glossy, hood-shaped, obtuse, the inner twice to thrice as long as the outer, the latter linear-spathulate, slightly woolly at margin — August to October — Alpine Lebanon.

3. H. pygmæum, Post. (Plantæ Postianæ, Fasc. II. Lausanne, 1891). ♃ .05 to .1 ; appressed-cobwebby-fleecy ; trunklets subterranean, suckers diffise ; stems ascending, simple, 2-4-flowered. Leaves of sterile branches oblong-spathulate, pannous, densely imbricated, forming spherical heads as large as a pea, of fertile stems fleecy, viscid, oblong-spathulate, mucronate, short-decurrent at base, revolute at margin. Heads short-peduncled, a little larger than a pea, corymbed, globular, *light crimson;* scales of involucre imbricated, obtuse, the lowest round, the uppermost oblong-spathulate, all greenish at base, light-crimson toward tip ; akenes fine-papillose — July — Sandy hillside at base of Harf-Râm-el-Kebsh (Antilebanon).

4. H. plicatum, D.C. ♃ .2 to .4, trunk prostrate, woody ; stems herbaceous. Leaves flat, appressed-greyish-pubescent, those of suckers oblong to linear-spathulate, of flowering stems linear, obtuse, acute or acuminate. Corymb terminal, compound, rather loose ; pedicels about as long as .007 long heads ; scales of involucre light golden, glossy, erect, firm, rather loose, obtuse, the inner three times as long as the outer ; pappus dull white — May to September — Subalpine and alpine Lebanon, Amanus, and northward.

5. H. sanguineum, L. ♃ *Bezâz-el-'Adhrâ.* .3 to .6 ; stem erect, simple or branching above. Leaves oblong-spathulate to oblong-lanceolate, those of stem tapering at base, decurrent, acute. Heads .003 to .004 long, sessile, in short-peduncled clusters, forming dense corymbs ; scales of involucre *deep crimson*, small, hooded, obtuse, the outer nearly round, the inner spathulate, tapering into a woolly claw, acute -- April and May -- Hills and shrubby places ; coast to middle and subalpine mountain zones ; common.

6. H. Aucheri, Boiss. ♃ .4 to .6, appressed-canescent ; trunks woody, procumbent, naked ; suckers and stems ascending. Leaves rather flat, the lower linear-spathulate, .07 long, tapering into a long petiole. Corymb terminal, many-headed, rather dense, *subtended by the short, upper, bract-like leaves ;* heads golden, globular, rather large ; scales of involucre obtuse, glandless, the outer ovate, very short, the inner *linear-spathulate,* spreading at tip — Spring — Dry hills near Marash.

7. H. Armenium, DC. ♃ .3 to .5, woody at base, sterile branches short, the flowering erect or ascending, leafy. Leaves velvety-woolly, or glandular, or cobwebby, the lower linear-spathulate, the upper linear. Corymb terminal, composite, rather loose ; pedicels as long as *top-shaped*, truncate heads ; scales of involucre golden, glossy, glabrous, except at somewhat woolly margin, the lower small, ovate, obtuse, the inner as long as flowerets — Summer — Dry places and rocks ; subalpine and alpine Amanus to Aintâb, and northward, and eastward.

Var. **lacteum,** Boiss. Involucre *white* — Aintâb, and northward.

* * *Intermediate scales of involucre longer than flowerets, radiating.*

8. H. Billardieri, Boiss. ♃ .1 to .3, appressed-woolly-canescent ; rootstock woody ; stems erect, leafy, 2-6-headed. Lower leaves obovate to spathulate, obtuse, tapering at base, those of stem small, oblong-linear, acutish. Heads sessile or pedicelled, *snow white or pinkish*, .015 broad ; scales of involucre loose, obtuse, glossy, the outer oblong-elliptical, the inner linear-spathulate, tapering to a short, glabrous claw, all spreading wide open in fruit — May to July — Rocky places ; subalpine Lebanon.

14. LEYSSERA, L. Leyssera.

Heads many-flowered, rayed, heterogamous. Involucre imbricated in several rows. Receptacle fibrous, chaffy at margin. Ray-flowerets strap-shaped, narrow, pistillate, disk-flowerets tubular, perfect. Marginal akenes abortive, crowned with one row of very short pales, those of disk cylindrical, furrowed, with an outer row of short pales and an inner of bristles plumose at tip — Dwarf, desert herbs, with small, yellow, oblong heads.

L. capillifolia, Willd. ☉ *Simsum. Mashruḥah.* .05 to .1, branching from neck, branches numerous, filiform. Leaves filiform. Heads on long, filiform peduncles, axillary and terminal ; scales of involucre glabrous, the outer oblong, obtuse, the inner linear, scarious-tipped, longer than rays — Spring — South end of Dead Sea to Sinai and Egypt.

15. INULA, L. Elecampane. *Ra'â' Ayyûb.*

Heads many-flowered, heterogamous, radiate, rarely discoid. Marginal flowerets commonly in 1 row, strap-shaped or tubular, 3-cleft; central flowerets perfect, 5-toothed. Involucre imbricated in several rows. Receptacle naked. Anthers with 2, fringed-ciliate appendages at base. Pappus composed of 1 row of similar bristles — Herbs, sometimes shrubby at base, with yellow heads.

* *Akenes nearly cylindrical, ribbed, not tapering at tip. Pappus free.*

† *Akenes glabrous. Pappus of numerous bristles. Outer scales of involucre leaf-like.*

1. I. salicina, L. ♃ .3 to .5 ; stems simple, monocephalous to corymbose. Leaves firm, scabrous at margin, lanceolate, acuminate, sessile, the upper half-clasping. Heads .025 to .035 broad, peduncled ; outer scales of involucre oblong-lanceolate, ciliate, inner somewhat longer, scarious, erect, linear ; rays *more than twice* as long as involucre — June — Subalpine Lebanon.

2. I. Germanica, L. ♃ .3 to .4 ; stem erect, hairy, corymbose. Leaves firm, oblong to oblong-lanceolate, acute or mucronate, sessile, scabrous-margined. Heads oblong to hemispherical, .006 long ; outer scales of involucre ovate-triangular, acute, sometimes spreading at tip, acuminate, as long as disk-flowers ; rays *slightly overtopping* the involucre — June — Thickets and hill tops near Beilân (Amanus).

3. I. Conyza, DC. ② .6 to 1, woolly ; stem paniculate-corymbose. Leaves elliptical to oblong-lanceolate, the radical tapering into a petiole, those of stem sessile. Heads obconical-hemispherical, .008 to .01 long, *subsessile ;* scales of involucre gradually longer from without

inward, linear, acute, the outer leaf-like at tip, recurved, the inner scarious ; pistillate flowers in several rows, somewhat strap-shaped, trifid, *not longer than involucre* — September — Rocky and bushy places near Antioch.

† † *Akenes more or less hirsute. Pappus of many bristles.*

4. **I. Britanica,** L. ♃ More or less appressed-woolly or villous ; stem erect, corymbose. Leaves entire or obsoletely toothed, the lower lanceolate, *tapering into a petiole*, the upper sessile, oblong-lanceolate, acuminate. Heads *rather large ;* scales of involucre about equal, loose, linear-lanceolate, acuminate ; rays about *twice* as long as involucre — Summer —

Var. **rupestris,** Boiss. More slender ; leaves narrower ; heads smaller ; outer scales of involucre spreading from middle — Moist places near Marash.

5. **I. crithmoides,** L. ♄ *Haṭab-zeiti.* .3 to .4, *woody at base, glabrous*, corymbose to monocephalous. Leaves *fleshy*, green, *linear-spathulate*, obtuse, the lower frequently 3-toothed toward tip, *those of axils clustered.* Peduncles *long*, beset with linear bracts ; heads .03 broad ; scales of involucre linear-lanceolate, acuminate, the outer somewhat shorter ; rays about *twice* as long as involucre — May to September — Rocks and inundated places along coast.

† † † *Akenes hirsute. Pappus composed of* 5-10 *bristles.*

6. **I. heterolepis,** Boiss. ♃ Pannous or canescent, woody and scaly at base, corymbose above. Root-leaves *ovate or ovate-orbicular*, with short-tapering or rounded base, entire or minutely crenate. Heads terminal, hemispherical, nearly sessile, frequently bracted by the upper two leaves ; outer scales of involucre oblong-linear, very obtuse, pannous, inner longer, membranous, lanceolate — June — Qal'at-esh-Shaqîf.

* * *Akenes oblong, tapering into a short neck. Bristles of pappus united at base into a short cup. Glutinous plants with strong smell.*

7. **I. viscosa,** L. ♃ *'Urq-eṭ-ṭayyûn.* .5 to 1 or more, woody at base, glandular-hairy ; stems rigid, paniculate. Leaves *lanceolate to linear-lanceolate*, sessile, remotely denticulate. Heads .008 long, peduncled, in a leafy panicle ; scales of involucre puberulent, the outer short, oblong, obtuse, the inner linear ; rays few, scarcely once and a half as long as involucre — July to December — Common everywhere in mountains to subalpine regions.

8. **I. graveolens,** L. ⊙ .5 to .8, glandular-hairy. Leaves *linear-lanceolate to linear*, entire or obsoletely denticulate, sessile. Heads .006 long, short-peduncled in a loose, leafy panicle ; scales of involucre few, glandular, lanceolate-linear, the outer somewhat shorter ; rays few, scarcely longer than involucre — July to December — Common along coast and coast range to middle zone.

16. IPHIONA, Cass. Iphiona. *Zifrah. Zufrah.*

Heads discoid. Flowerets all perfect, with almost no tube, and a long, cylindrical, 5-toothed throat. Involucre appressed, imbricated, coriaceous. Receptacle honey-combed. Anthers with short, entire

appendages at base. Akenes cylindrical. furrowed. Bristles of pappus in many rows, rigid, gradually lengthening from outer to inner — Bushy plants, with stiff branches and prickly leaves.

1. I. juniperifolia, Cass. ♄ .3 to .5, glabrous ; branches *intricate*, forked, corymbose above. Leaves linear, pinnatipartite to base into 2-6, prickly lobes. Outer scales of involucre *ovate*, *obtuse*, *abruptly mucronate*, inner lanceolate — Spring — Callirrhoë to Sinai and Egypt.

2. I. scabra, DC. ♄ .3 to .5, glandular-scabrous, corymbose. Leaves oblong to linear, with 2-4, short spines at base. Scales of involucre glandular, the outer *triangular*, tapering into a prickle, the inner linear — Spring — Dead Sea to Sinai and Egypt.

17. VARTHEMIA, DC. Varthemia.

Heads discoid, obconical. Flowerets tubular, all perfect, 5-toothed. Scales of involucre few, truncate. Receptacle honey-combed. Anthers caudate at base, appendages frequently ragged. Akenes somewhat compressed. Bristles of pappus numerous, scabrous, nearly in 1 row, twice as long as akene — Shrubby, branching, unarmed plants, distinguished from Inula by somewhat flattened akenes.

1. V. montana, Vahl. ♄ *Huneideh.* .4 to .5, woolly with yellow glands interspersed ; stems wand-like, branching from middle, branches rigid, short, 1-3-headed. Leaves *ovate-oblong*, half-clasping, the lower .025 long, .01 broad, those of branches and peduncles small, scale-like, spreading ; outer scales of involucre *somewhat glutinous*, oblong, spreading-recurved at tip, inner longer, linear — August — Rocky soil at base of Sinai. Used by the Arabs as a remedy for diarrhœa.

2. V. iphionoides, Boiss. et Bl. ♄ .5 to .6, tomentellous, stems brittle, terete, branching, paniculate from base ; branches short. Leaves *oblong-spathulate to spathulate-linear*, .01 to .015 long, .006 broad at tip, slightly tapering toward base, half-clasping, the upper much smaller, oblong, *crowded at base of heads.* Scales of involucre tomentellous, erect, loose, the outer oblong, obtuse, the inner linear, membranous — September and October — Rocks ; coast to middle mountain zones and interior plains.

3. V. candicans, Del. ♄ .5 to .6, *velvety-pubescent ;* branches erect or diffuse, leafy. Leaves linear-spathulate, obtuse, revolute-margined, the lower .025 long, .003 broad, the upper smaller. Heads 3-5 at ends of branches ; scales of involucre few, erect, obtuse, the outer herbaceous, oblong, the upper linear — Autumn — Borders of Egyptian desert, and westward.

18. PULICARIA, Gærtn. Fleabane.

Heads many-flowered, heterogamous. Marginal flowerets in 1 row, strap-shaped, pistillate, those of disk perfect, tubular, 5-toothed. Involucre imbricated in several rows. Receptacle naked. Anthers bicaudate at base, appendages bordered with ragged fringe. Akenes beakless. Pappus in 2 rows, the outer very short, crown-like, toothed, persistent, the inner composed of brittle, scabrous bristles — Annual or perennial herbs.

* *Perennials.*

1. P. dysenterica, L. ♃ Appressed-woolly-canescent. Leaves soft, wavy, oblong-lanceolate, denticulate or entire, those of stem oblong-lanceolate, with a heart-shaped, clasping base. Heads .02 broad ; peduncles rather long ; scales of involucre linear-cuspidate, somewhat spreading ; rays numerous, about twice as long as involucre ; bristles of pappus 14-20, four times as long as akene — August and September —

Var. **microcephala,** Boiss. More branching ; heads a little smaller ; rays somewhat shorter — Wet places ; common to subalpine regions.

2. P. longifolia, Boiss. ♃ .3 to .6, viscid, hirtulous, with short hairs tubercled at base ; stem panicled or corymbose above. Leaves .06 to .08 long, nearly entire, the lower *linear-oblong*, with long tapering base, the upper *linear*, half-clasping, minutely auricled. Heads .01 broad, long-peduncled ; scales of involucre hirsute, linear, acuminate ; rays 3-toothed, *not longer than involucre ;* bristles of pappus about *ten*, thrice as long as akenes — Summer — Moist places ; Sinai to Egypt.

3. P. undulata, L. ♃ *Rabur. Rabbul.* .2 to .4, more or less woolly-canescent. Leaves wavy, cut or toothed, the radical oblong, tapering at base, those of stem oblong-lanceolate, auricled-clasping. Heads terminal, .015 to .02 broad ; peduncles rather long, scaly toward tip ; scales of involucre oblong-linear, acuminate, somewhat shorter than disk ; rays about *twice* as long as involucre ; bristles of pappus about 15, *thrice* as long as akene — Spring — Sandy places from Dead Sea to Sinai and Egypt.

* * *Annuals.*

4. P. vulgaris, Gærtn. ⊙ .3 to .4, crisp-woolly, branching from base, paniculate-corymbose. Leaves repand-denticulate, the lower oblong, tapering into a petiole, the upper half-clasping at base, oblong-lanceolate. Heads .008 broad, terminal ; peduncles *short ;* scales of involucre villous, linear-lanceolate, acuminate ; rays erect, *scarcely longer* than involucre ; bristles of pappus 8-10, *about as long as* akene — Spring — Beirût.

Var. **alpina,** Post. .03 to .1 ; all the parts of the plant smaller ; heads .004 broad — Inundated places near top of Akherdagh.

5. P. Arabica, Cass. ⊙ .3 to .6, hirsute or woolly, dichotomous. Lower leaves oblong, tapering into a petiole, upper half-clasping, linear-lanceolate, auricled at base. Heads in forks and terminal ; scales of involucre hirsute, lanceolate-linear, acuminate ; rays spreading, a little longer than involucre ; bristles of pappus *ten*, thrice as long as akene — April to September — Moist places ; coast and lower mountains and interior plain ; Jordan Valley.

Var. **augustifolia,** Post. Leaves narrower than in type. Stem and branches glabrescent — Besherri.

19. FRANCŒURIA, Cass. FRANCŒURIA.

Heads many-flowered, heterogamous. Marginal flowerets in 1 row, strap-shaped, pistillate, those of disk perfect, tubular, 5-toothed. In-

volucre imbricated. Receptacle naked. Anthers bicaudate at base with fringed bristles. Akenes beakless. Pappus in 2 rows, united at base and falling together, the outer row crown-like, toothed, the inner composed of bristles with club-shaped tips — Perennials, woody at base, with aspect of Pulicaria.

F. crispa, Forsk. ♃ *Qutqât. Sabût. Ra'râ'. Tajâr. Khanûf. Afrakh. Dithdâth. Karwân.* .4 to .5 ; stems numerous, appressed-canescent, corymbose above. Leaves cobwebby-canescent, linear-spathulate, acutely toothed, those of stem and branches half-clasping. Heads .005 broad ; scales of involucre glabrescent, linear, acuminate ; rays not longer than involucre ; inner bristles of pappus 7-10, four times as long as akene, barbed at tip — January to April — Dry, sandy soil ; Dead Sea to Sinai and Egypt.

20. GYMNARRHENA, Desf. GYMNARRHENA.

Heads many-flowered, discoid. Involucre many-rowed, scales boat-shaped, coriaceous, rigid. Receptacle convex, bristly at margin. Marginal flowerets pistillate, in many rows, each subtended by a scale; the corolla slender, tubular, 3-toothed ; the pappus in several rows, the outer consisting of scabrous bristles, the inner of 7-9, lanceolate-linear, acuminate pales ; style 2-lobed ; akenes obconical, villous. Central flowerets few, minute, abortive, staminate, not subtended by pales ; the corolla funnel-shaped ; pappus in 1 row of lanceolate, acuminate, ciliated pales ; style simple, club-shaped, acute, papillose ; akenes filiform, glabrous — Herbs, stemless or nearly so, with crowded heads.

G. micrantha, Desf. ⊙ .02 to .03. Leaves linear-lanceolate, .1 long, acutish, with dilated, membranous base, rosetted around the sessile, clustered heads, and much longer than the cluster. Scales of. involucre glossy, longer than flowerets, mucronulate — March to July — Sandy places in deserts, Sinai to Dead Sea, Jordan Valley, Damascus, Syrian Desert, and north-eastward.

21. ANVILLÆA, DC. ANVILLÆA.

Heads many-flowered, discoid ; flowerets all tubular, perfect. Involucre at length woody, outer scales leaf-like at tip, inner in 2 rows, appressed, spinescent. Receptacle chaffy. Anthers caudate at base. Akenes uniform, 4-sided, bald and umbilicate at tip — Rigid, branching, desert shrubs.

A. Garcini, Burm. ♃ Appressed-canescent, branching from base. Leaves obovate-spathulate to oblong-linear, tapering at base, repand or fringed-toothed. Peduncles short and thick ; outer scales of involucre spathulate at tip, more or less reflexed, inner rather longer than involucre ; pales of receptacle truncate at tip, abruptly bristly-cuspidate — March and April — Egypt to Sinai, Wadi Harûn, and eastward.

22. ASTERISCUS, Mœnch. ASTERISCUS. *'Ain-el-Boqr. 'Arar.*

Heads many-flowered, radiate. Involucre imbricated, the outer scales leaf-like. Receptacle chaffy, Ray-flowerets strap-shaped, in 1

row, 3-toothed ; disk flowerets terete, 5-toothed. Anthers caudate. Akenes uniform, turbinate, prismatic-triquetrous ; pappus crown-like, irregularly dentate — Annual or perennial herbs.

1. A. aquaticus, L. ⊙ .3 to .4, villous-pubescent ; stem erect, with spreading branches. Leaves lanceolate, obtuse, the lower tapering into a petiole, the upper sessile, nearly half-clasping. Heads .03 in diameter (including rays) sessile ; bracts *crowded*, *longer than heads ;* outer scales of involucre linear-lanceolate, longer than rays, inner ovate, obtuse ; rays very short ; akenes silky ; pappus fringed-toothed — February to June — Ditches and wet places ; coast and interior.

2. A. pygmæus, Coss. ⊙ *Nuqûd.* Dwarf, grey-villulose, almost stemless, simple or branching. Leaves oblong, obtuse, *all tapering into a long petiole.* Heads sessile, overtopped by upper leaves ; outer scales of involucre linear-lanceolate, *much longer* than rays, inner oblong-obtuse ; rays very short ; akenes silky ; pappus subulate-tipped, scarcely toothed — Spring — Clayey and inundated places ; Jericho to Arabia Petræa, and eastward.

3. A. graveolens, Forsk. ♃ *Nimwâr. Qassaikah, Buheineh. Nuqd.* .3 to .5, grey-velvety, branching from a rather woody base ; branches rigid, forked. Leaves linear-oblong, tapering at base, except the lower all cordate-clasping, remotely cut or toothed. Heads .02 in diameter (including rays), *short-peduncled ;* floral leaves 1-3 ; outer scales of involucre linear, acute, inner shorter, oblong ; rays a *little longer* than involucre ; akenes hirsute — Spring — Wadis about Dead Sea to Sinai and Egypt.

4. A. Schimperi, Boiss. ♄ .4, silky-canescent, branching, forming dense clumps. Leaves entire, oblong-spathulate. Heads smaller than in last ; bracts as long as rays ; scales of involucre *oblong ;* rays very small, few, not longer than involucre ; akenes hirsute — Spring — Sinai.

23. PALLENIS, Cass. PALLENIS.

Heads many-flowered, radiate. Involucre imbricated, outer scales spiny-tipped. Receptacle chaffy. Ray-flowerets in 2 rows, strap-shaped, 3-toothed, tube triquetrous, winged ; disk-flowerets winged on inner side, dilated at base. Anthers caudate. Akenes hirsute, those of ray-flowerets flattened, 2-winged, triquetrous, those of disk flattened, triquetrous. Pappus short, crown-like, toothed — Herbs with aspect of Asteriscus.

P. spinosa, L. ⊙ *Bakhûr Mariam.* .5 to 1, hirsute or villous. Lower leaves oblong-spathulate, tapering into a petiole, upper lanceolate, sessile. Outer scales of involucre linear-lanceolate, with prominent nerves, rigid, much longer than rays, inner ovate, cuspidate, as long as ray-flowers — Spring and summer — Fields and waysides ; common except in Alpine and desert regions.

24. CHRYSOPHTHALMUM, Sch. CHRYSOPHTHALMUM.

Heads many-flowered, discoid, flowerets all tubular, perfect or some of the marginal pistillate. Scales of involucre closely imbricated

in 2-3 rows. Receptacle chaffy. Anthers caudate at base. Akenes very small, prismatic, crowned with a short, 1-rowed, hair-like pappus. Perennial herbs, with wand-like, erect stems.

Ch. montanum, DC. ♃ .3 to .4, appressed-silvery-canescent, woody at base, many-stemmed. Leaves entire, the lower tapering to a petiole, the upper oblong-lanceolate, sessile. Heads .01 in diameter, peduncled, subtended by 2-3, lanceolate bracts as long as or longer than the involucre ; scales of involucre linear-lanceolate — June and July — Rocks ; Aintâb, and northward.

25. POSTIA, Boiss. et Bl. Postia.

Heads many-flowered, radiate or discoid. Involucre imbricated in about 2 rows. Receptacle chaffy. Marginal flowerets pistillate, either strap-shaped, 3-toothed, in one row, or filiform, very few. Anthers short-caudate. Akenes somewhat flattened, 4-angled, hirsute, uniform. Pappus double, the outer of very short, persistent hairs, the inner of 2-3, elongated, barbellate pales, dropping early — Woolly herbs, with many stems from a woody root-stock.

1. P. lanuginosa, DC. .3 to .8, pannous-canescent ; stems numerous, wand-like, rigid, 1-3-headed. Lower leaves obovate-spathulate, tapering to a petiole, upper sessile, *lanceolate,* .025 long, entire or denticulate, bearing buds in axils. Heads .02 *broad, rayed ;* outer scales of involucre lanceolate, rather obtuse, inner lanceolate-linear ; rays twice as long as involucre ; inner pappus of 2 pales, that of rays oftener of 1 — June and July — Rocky hillsides ; Wadi Ibrîsah (Lebanon) ; northern Cœlesyria and Antilebanon to Damascus, and Palmyrene desert.

2. P. microcephala, Boiss. ♄ .25, pannous-canescent ; stems wand-like, rigid, 1-headed. Leaves oblong-spathulate, .012 long, rather obtuse, tapering at base. Heads *smaller than a pea, discoid ;* scales of involucre somewhat concealed in wool, oblong ; pistillate flowers very few ; inner pappus of three pales — Summer — Plain of Ma'lûlah (Antilebanon).

26. AMBROSIA, Tourn. Ragweed. Ambrosia. *'Anbarîyeh.*

Monœcious. Staminate heads, hemispherical ; scales of involucre united in a cup ; flowerets tubular, 5-toothed ; receptacle bristly ; anthers free. Pistillate heads 1-flowered, enclosed each in an ovate, bladdery involucre, closed except at tip, indurated in fruit, and tapering into a beak enclosing the style. Heads clustered, surrounded by bracts. Stigmas 2, filiform, protruding. Akenes bald — Annual herbs, lower leaves opposite, upper alternate. Spikes terminal, bearing pistillate heads at base, frequently compound, and staminate heads toward tip.

A. maritima, L. ⊙ *'Useirah. Ghubeirah. Demsîs.* .5 to .8, appressed-canescent. Leaves ovate in outline, 2-pinnatipartite into toothed, oblong lobes. Involucre of pistillate flowerets surrounded about the middle with 4-6, blunt, horn-like projections — January to October — Coast.

27. XANTHIUM, Tourn. COCKLEBUR. *Badhinján-teriáqi.*

Monœcious. Staminate heads globular; involucre of several scales; flowerets tubular, 5-toothed; receptacle chaffy; anthers free, not caudate; style filiform, undivided. Pistillate heads ovate, 2-flowered, involucre gamophyllous, 2-celled, covered without with hooked prickles; style 2-cleft; stigmas papillose. Akenes compressed, bald — Annual herbs, with alternate leaves and sessile, solitary or racemed heads, the upper staminate.

1. X. strumarium, L. ⊙ .8 to 1, *unarmed.* Leaves long-petioled, scabrous, *cordate-triangular,* with irregularly toothed lobes. Heads racemed — Spring and summer —

Var. **antiquorum,** Boiss. Prickles extending to tip of involucre; beaks divergent — Roadsides and waste places; common except in alpine and desert regions.

2. X. spinosum, L. ⊙ .6 to 1, *Spines at base of leaves tripartite, yellow,* .01 to .03 long; leaves canescent at lower surface, green except along nerves at upper, short-petioled, *wedge-shaped* at base, oblong-lanceolate, undivided or 3-lobed, the middle lobe much longer. Staminate heads terminal, pistillate involucres usually solitary in axils, nodding — Summer — Near mouth of Beirût River.

28. ECLIPTA, L. ECLIPTA.

Heads many-flowered, radiate. Ray-flowerets short, slender, in few rows, pistillate. Disk-flowerets tubular, 4-toothed, perfect. Scales of involucre herbaceous, in 2 rows. Receptacle chaffy. Branches of style in pistillate flowerets short, filiform, in perfect rather dilated, compressed. Akenes tubercled and puberulent at tip, bald, those of ray-flowerets triquetrous, of disk somewhat compressed — Annual herbs, with opposite leaves and white flowers.

1. E. alba, L. ⊙ .4 to 1, or more. Leaves *obsoletely denticulate,* oblong-lanceolate, tapering at each end. Scales of involucre ovate, obtuse, *scarcely longer than flowerets* — September to March — Wet places; Ghôr-es-Sâfiyeh.

2. E. marginata, Hochst. ⊙ .5 to 1. Leaves *dentate,* oblong-lanceolate to ovate-oblong, tapering at each end. Scales of involucre oblong-lanceolate, *twice as long as* flowerets — August and September — Swampy places; Alexandretta to Amanus.

29. BIDENS, L. BUR-MARIGOLD.

Heads (in ours) discoid. Flowers tubular, perfect. Scales of involucre in 2 rows, the outer harbaceous. Receptacle chaffy. Branches of style tipped by a short cone. Akenes obovate-cuneate, truncate, 2-4-bearded, beards persistent, retrorse-prickly — Annual herbs, with opposite leaves and yellow flowers.

B. tripartita, L. ⊙ 1 or more, glabrescent; stem erect, branching. Leaves petioled, 3-parted into lanceolate, toothed leaflets. Heads erect, solitary; outer scales of involucre linear-spathulate, unequal, green, spreading, twice to thrice as long as the inner, which are oblong, brown, scarious-margined, about as long as flowerets — August

and September — Ditches and swamps ; Amanus to Marash, and northward.

30. ANACYCLUS, Pers. Anacyclus. *Beisûm.*

Heads many-flowered, radiate, rarely discoid. Ray-flowerets pistillate, tube flattened, winged. Disk-flowerets tubular, perfect, 5-toothed. Akenes glabrous, more or less flattened, often crowned, the outer, at least, with a broad, pellucid wing on each side, terminating in a small ear. Involucre imbricated. Receptacle chaffy — Annual herbs with aspect of Anthemis.

1. A. radiatus, Loisel. ⊙ .3 to .4, more or less villous-pubescent ; stem erect, branching. Leaves oblong, bipinnatipartite into oblong, mucronate lobes. Heads .03 broad, short-peduncled ; scales of involucre obtuse, the outer oblong, the inner dilated at tip into a scarious, ragged appendage ; rays yellow ; akenes wedge-shaped, more or less flattened, the outer winged at each side, wings ending in an erect, dentate ear, the middle narrow-winged, the inmost wingless, bald — Spring — Waste places and roadsides.

2. A. nigellæfolius, Boiss. ⊙ .2 to .3, somewhat appressed-hirsute ; stem simple or stiff-branched from middle. Leaves ovate-oblong, bipinnatipartite into *very narrow, linear*, mucronate, undivided or bifid lobes. Heads .01 broad, rather long-peduncled ; outer scales of involucre *ovate-triangular, acute*, the rest obtuse ; rays *white*, ovate-oblong, *a little longer than involucre ;* akenes obovate, wings of the outer rather broader then seed, of the inner narrower, united at tip — May and June — Grassy and cultivated hills about Rasheiyah (Antilebanon), and Mureijât (Lebanon).

31. ACHILLEA, L. Yarrow.

Heads many-flowered, radiate, rarely discoid. Marginal flowerets in 1 row, pistillate, the rest perfect, 5-toothed, the tube usually more or less compressed, and the base more or less produced around the tip of the akenes. Involucre imbricated. Receptacle chaffy. Akenes compressed, tapering at base, tip rather broad, bald — Perennial herbs, often woody at base, with white or yellow flowers.

* *Rays 5 or fewer, or 0. Scales of involucre persistent.*

† *Leaves pinnatisect into segments neither transverse nor imbricated.*

‡ *Flowerets white, purplish, or cream-colored.*

§ *Axis of leaves toothless.*

1 A. Millefolium, 2 setacea, 3 odorata.

§ § 2 *Axis of leaves toothed.*

4 A. Ligustica.

‡ ‡ *Flowerets golden-yellow.*

5 A. micrantha.

† † *Leaves pinnatisect into minute, transverse, imbricated lobes.*

6 A. tomentosa, 7 Santolina, 8 falcata, 9 conferta, 10 Aleppica.

† † † *Leaves undivided, serrulate. Heads discoid.*

11 A. fragrantissima.

* * *Rays numerous, large. Scales of involucre soon deciduous.*

12 A. membranacea.

1. A. Millefolium, L. ♃ Milfoil. .5 to .8; stem erect, simple or branching above. Leaves appressed-hairy, *oblong-lanceolate in outline*, 2-pinnatipartite into linear, acute, mucronate, often 2-3-fid lobes. Corymb dense, compound ; heads .004 long ; *rays white or purplish* — Summer — Damascus.

2. A. setacea, M K. ♃ .3 to .8 ; stem erect, simple. Leaves somewhat villous, linear-lanceolate, bipinnatisect into crowded, linear, mucronate lobes. Corymb dense ; heads oblong, .003 long ; *rays white or cream-colored* — Summer — Amanus to Aleppo, and northward, and eastward.

3. A. odorata, Koch. ♃ .3 to .4, appressed-canescent, rarely green ; stem simple or slightly branching above. Leaves obovate-oblong, to oblong-lanceolate in outline, the lower bipinnatisect into oblong, acute, nearly entire lobes, the upper pinnatipartite into linear-oblong, toothed segments. Heads .003 long ; *rays white* — May to October — Alpine and subalpine Lebanon.

4. A. Ligustica, All. ♃ .5 to .8, appressed-hirsute, glandular-punctate ; stem furrowed, *very leafy*, simple or branching above. Leaves *ovate* in outline, bipinnatisect, primary segments about 3 on each side, cut into divergent, oblong, acute, entire or few-toothed and cut lobes. Corymb compound ; heads oblong — Summer — Between Ehedin and the Cedars.

5. A. micrantha, M.B. ♃ .5 to .8 ; stem erect, simple or branching from base. Leaves villous, oblong-linear in outline, bi-tripinnapartite into minute, linear lobules. Corymb dense, compound ; heads .004 long, ovate ; rays one-third as long as involucre — April to June — Dry hills and fields ; coast to middle mountain zone, and interior plains.

6. A. tomentosa, L. ♃ Villous ; stems slender, somewhat rigid, simple, low. Leaves lanceolate-linear in outline, pinnatisect, segments numerous, short, transverse, crowded, *digitately parted into* 3-7, *oblong, mucronate lobules ;* upper leaves narrower, pectinate. Corymb compound ; rays half as long as involucre — Summer — Moab (Paine).

7. A. Santolina, L. ♃ .2 to .6 ; stems terete, simple or branching below, canescent. Leaves pubescent ; *segments of lower leaves and those of young shoots somewhat distant.* Corymbs compound ; peduncles shorter or a little longer than .005 long heads ; scales of involucre oblong, obtuse ; rays *yellow*, very short — April to June — Dry hills and sandy places ; middle mountain regions and interior plains.

8. A. falcata, L. ♄ *Qaisûn.* .3 to .8, woody at base ; stems pannous, terete, simple. Leaves canescent, linear-terete, at length falcate ; *segments minute.* Corymb compound ; peduncles twice to four times as long as .004 long heads ; rays *sulphur-colored*, one-third to one-half as long as involucre — April to September — Dry places ; subalpine Lebanon, Antilebanon, and interior plains.

Var. **breviradiata,** Boiss. Rays much shorter than involucre — Lebanon, Antilebanon and Damascus to Palmyra.

9. A. conferta, DC. ♃ .3 to .4 ; stems *grooved*, simple or branched. Leaves appressed-puberulent, linear ; segments minute. Corymb *dense*, compound ; peduncles *shorter* than .005 long heads, thick ; rays *lemon-yellow*, *about one-third* as long as involucre — May and June — Dry places ; Zaḥleh ; Ḥaurân.

10. A. Aleppica, DC. ♃ .3 to .5, puberulent, virescent ; stems striate, often branching. Leaves linear-terete, elongated, somewhat zigzag ; segments minute. Corymb *very crowded ;* peduncles shorter than angular, .004 long heads ; rays *golden-yellow*, few, *one-fourth* as long as involucre — Spring — Abandoned fields ; El-'Arabah to Lebanon, Cœlesyria, Antilebanon, Aleppo, and north-eastward.

11. A. fragrantissima, Forsk. ♄ *Qaisûn. Babûnij. Bu'aiterân.* .6 to 1 ; stems numerous, white-woolly, wand-like, rigid, paniculate-corymbose. Leaves small, sessile, thickish, *oblong-linear to ovate, serrate.* Heads ovate-oblong, .003 to .004 long, as long as pedicels, in clusters of 3-4 on each branch — July to October — Dry places ; Sinai to Cœlesyria, Antilebanon, Damascus, Palmyra, and north-eastward. A shrub with delightful fragrance.

12. A. membranacea, Labill. ♄ .2 to .4, appressed-canescent, many-stemmed ; stems erect, angular, simple or with few branches. Leaves linear in outline, pinnatisect into small, oblong, transverse, imbricated, toothed-lobed segments. Heads 1-3, .015 *broad*, long-peduncled : *rays nearly as long as involucre* — May — Rocky hillsides ; Moab to Damascus, Palmyra, Aleppo, and eastward.

32. DIOTIS, Desf. Diotis.

Heads many-flowered, discoid. Flowerets all perfect, the 5-toothed tube flattened-triquetrous, 2-auricled at base, at length thickened, fungous, embracing the tip of the akene. Akenes oblong, 3-4-angled, tapering at base, auricles adnate to the corolla-tube. Involucre imbricated. Receptacle convex, chaffy — White-pannous, perennial herbs.

D. maritima, L. ♄ *Hashîshat-er-Rîḥ.* .25 to .4 ; stems numerous from a woody root-stock, erect, and ascending, thick, zigzag, densely leafy, simple or sparingly branched. Leaves somewhat clasping at base, ovate to oblong, .005 to .015 long, obtuse, entire or crenulate. Heads globular, .007 in diameter, short-peduncled, crowded-corymbose ; scales of involucre concave, ovate-oblong, obtuse — May to November — Sands along coast.

33. ANTHEMIS, L. Chamomile. *Iqḥawân.*

Heads many-flowered, radiate, rarely discoid. Marginal flowerets strap-shaped, in 1 row, pistillate, rarely neutral, the rest perfect, 5-toothed, the tube often compressed or at length thickened at base. Involucre imbricated. Receptacle chaffy. Akenes either turbinate-obconical, the outer sometimes pyramidal, or 4-angled, 2-auricled, more or less clearly furrowed or striate-ribbed, tip sometimes bald, sometimes with a crown, somtimes ending in a lateral auricle — Annual or perennial herbs, with white, or rarely yellow rays.

* *Akenes 4-angled, more or less flattened, the marginal angles acute. Chaff keeled, inserted over the whole receptacle.*

† *Perennials or biennials.*

1 A. tinctoria.

† † *Annuals.*

‡ *Receptacle hemispherical — Tall species.*

2 A. altissima, 3 Palæstina, 4 cœlopoda.

‡ ‡ *Receptacle conical. Dwarf species.*

5 A. lyonettoides.

* * *Akenes obconical-turbinate, often angled, the outer sometimes pyramidal but not flattened. Chaff lanceolate-linear to ovate-oblong, inserted over the whole receptacle.*

† *Perennials. Rays white or* 0.

6 A. Cassia, 7 montana, 8 Blancheana, 9 pauciloba.

† † *Annuals.*

‡ *Corolla-tube glabrous.*

§ *Akenes rounded at tip.*

10 A. microsperma.

§ § *Akenes truncate, bald or surmounted by a low crown.*

¶ *Outer scales of involucre triangular or lanceolate, acute. Rays fertile, white.*

11 A. Philistæa, 12 leucanthemifolia, 13 deserti.

¶ ¶ *Outer scales of involucre obtuse, scarious.*

14 A. Rasheyana, 15 hyalina.

§ § § *Akenes with an auricle at their inner angle as long or half as long as they.*

16 A. melampodina, 17 Haussknechtii, 18 Chia.

‡ ‡ *Corolla tube hairy at base.*

19 A. scariosa, 20 cornucopiæ, 21 Hebronica, 22 Damascena,

* * * *Chaff subulate or lanceolate-linear, inserted only at top of receptacle (except in A. Kahirica).*

† *Rays sterile.*

23 A. Cotula.

† † *Rays pistillate.*

24 A. Kahirica, 25 pseudocotula, 26 rotata, 27 Tripolitana.

1. A. tinctoria, L. ♃ Yellow Chamomile. .4 to .8 ; stems numerous, wand-like, stiff, simple or branching. Leaves appressed-hirsute, canescent, oblong in outline, bipinnatisect into triangular-lanceolate, acute, *pectinate*, mucronate lobules. Heads .02 to .03 broad, long-peduncled ; outer scales of involucre lanceolate, acutish, inner oblong-linear, scarious at the obtuse tip ; rays yellow, shorter than involucre ; chaff abruptly tapering to a sharp cusp ; akenes many-grooved on each side, with a short crown — Spring and summer — Dry places ; Cassius and Amanus, and northward.

Var. **discoidea,** Boiss. Heads discoid — Mountains throughout.

2. A. altissima, L. ⊙ .3 to .8 ; stem rather rigid, branching. Leaves ovate-oblong in outline, 2-3-pinnatipartite into ovate-lanceolate, prickly-mucronate lobules. Peduncles at length thickened ; heads .03 to .04 broad ; outer scales of involucre lanceolate, inner oblong, scarious ; chaff oblong-spathulate, abruptly contracted into a *prickly cup, somewhat longer than flowerets ;* rays elliptical-linear ; akenes compressed, 4-angled, with acute, lateral angles, 10 ribs on each face, and a thin, membranous crown — April to August — Fields ; coast to middle mountain regions, and interior plains.

3. A. Palæstina, Reut. ⊙ .2 to .3, sparingly hirsute, erect, branching from neck, branches usually decumbent. Leaves ovate-oblong in outline, bipinnatipartite into *ovate-oblong,* mucronate lobules. Peduncles at length thickened ; heads .02 to .03 broad ; outer scales of involucre ovate-triangular, acute, inner oblong, obtuse, scarious at tip ; chaff cuneate, keeled, truncate, *unarmed or ending in a short point,* the outer sometimes tapering to a point longer than the involucre ; akenes as in last — Spring — Fields ; coast to middle mountain regions, and interior plains.

4. A. cœlopoda, Boiss. ⊙ Puberulent or glabrescent ; stem erect, divaricately branched. Leaves ovate in outline, bipinnatisect into minute, oblong-linear, callous-tipped, spreading lobules. Peduncles at length very thick and *hollow ;* heads .02 to .03 broad ; outer scales of *involucre oblong-lanceolate, acuminate,* inner obtuse, scarious at tip ; chaff oblong-linear, *keeled, tapering into a point shorter than the pale ;* akenes obsoletely 1-3-nerved on each side — Spring — Antilebanon.

Var. **Bourgæi,** Boiss. Branches less forked ; lobules of leaves narrower ; heads rather smaller — Base of Lebanon near Sidon ; Amanus.

5. A. lyonnetoides, Boiss. ⊙ .05 to .1, crisp-hairy. Leaves small, *oblong-linear in outline,* pinnatipartite into lanceolate, mucronate, entire or 2-3-fid lobes. Heads *discoid,* .003 to .005 broad ; scales of involucre oblong, scarious, *with a thick, brown nerve ;* chaff oblong, keeled, somewhat fringed, mucronate ; akenes small, smooth — May and June — Alpine Antilebanon.

6. A. Cassia, Boiss. ♃ .3 or more, appressed-silky, canescent, producing short, sterile, leafy twigs, and fertile, nearly simple, 1-headed stems. Lower leaves long-petioled, ovate-oblong in outline, pinnatipartite into few, linear or linear-oblong, entire or 2-3-cleft, rather obtuse, .01 to .02 long lobes, upper leaves oblong, sessile. Heads .03 broad, long-peduncled ; scales of involucre rather broad, the outer acutish, the inner obtuse, narrowly scarious ; rays as long as disk ; akenes whitish, short, surmounted by a rather long, delicate crown — June — Cassius. Immature specimens collected in April from el Kaff in the Nusairy Mountains seem to belong to this species.

7. A. montana, L. ♃ .25 to .4, appressed-canescent, silky, producing from the root-stock short, leafy twigs, and erect or ascending, simple or somewhat branching stems. Leaves usually 2-pinnatisect into linear, obtuse or acute, *muticous* lobes, Heads .02 to .03 broad ;

outer scales of involucre acute, inner obtuse, broadly scarious ; akenes tapering at base, more or less ribbed, with short crown or 0 — Summer —

Var. **Linnæana**, Boiss. et Godr. Heads radiate — Alpine Lebanon and Antilebanon to Marash, and northward.

Var. **incana,** Boiss. Heads discoid. Leaves 2-pinnatisect into short, linear-spathulate, obtuse lobules — Alpine Lebanon.

Var. **Anatolica,** Boiss. Heads discoid. Lobules of leaves short, narrow, crowded, obtuse — Subalpine Amanus.

Var. **tenuiloba,** Boiss. Appressed-greyish-hirsute. Heads discoid. Lobules of leaves slender.

8. A. Blancheana, Boiss. ♃ .2 to .3, silky-canescent, producing from the root-stocks very short, leafy twigs, and ascending, nearly simple stems. Lower leaves petioled, ovate in outline, pinnatipartite into few, linear-cuneate, 3-5-toothed or parted segments. Heads .02 broad, long-peduncled ; scales of involucre *tawny-margined*, acute, the outer triangular-lanceolate, the inner oblong ; rays as long as disk ; akenes angular, tipped with a short crown — Summer — Alpine and subalpine Lebanon.

Var. **discoidea,** Post. Heads discoid — Alpine Lebanon.

9. A. pauciloba, Boiss. ♃ .2 to .4, appressed-silky-canescent, producing from root-stock short, sterile twigs, and numerous, erect stems leafy at base, sparingly branched. Root-leaves oblong-cuneate, tapering into a long petiole, *somewhat short-truncate*, 3-*lobed, others parted or divided into* 2-5, *short, oblong-linear, obtuse lobes;* stem-leaves small, sessile, the upper undivided. Heads .01 broad, discoid, long-peduncled ; scales of involucre oblong to ovate, acutish ; akenes whitish, surmounted by a short, somewhat ragged crown — Spring — Subalpine Lebanon, Antilebanon, Aintâb, and north-eastward.

10. A. microsperma, Boiss. ⊙ .25, sparingly hirsute ; stems procumbent, very slender, branching. Leaves .01 long, .001 broad, *linear, with few lobes.* Peduncles rather long, slender ; heads small ; scales of involucre oblong-linear ; chaff oblong-lanceolate, keeled, abruptly tapering ; rays as long as disk ; akenes .001 long, black, 7-8-ribbed — Spring — Desert between Cairo and el 'Arîsh.

11. A. Philistea, Boiss. ⊙ .2 to .25, sparingly hairy, branching from neck ; stems ascending, simple or branched, ending in short, at length thickened peduncles. Leaves .01 to .015 long, oblong in outline, pinnatisect into linear, mucronate, undivided or 3-fid lobes, lower leaves petioled, upper pectinate-dentate near base. Outer scales of involucre acute, the rest obtuse, broadly scarious ; chaff oblong-cuneate, abruptly mucronate, somewhat ragged ; rays hardly longer than disk ; akenes obpyramidal, ending in a thin crown, in the outer ones 4-5-parted — March and April — Sandy plains near Gaza, and southward in the desert.

12. A. leucanthemifolia, Boiss. .2 to .3, sparingly hairy, branching from neck or above ; stems ascending or prostrate. Leaves oblong to cuneate-obovate, crenate or lobed, pectinate dentate near base, the upper bract-like. Peduncles short, at length much thickened ; heads .025 broad ; outer scales of involucre linear-lanceolate, inner

linear-oblong, *all obtuse*, scarious ; chaff oblong-lanceolate, keeled, acuminate, as long as involucre ; rays white, at length reddish, as long as disk ; akenes ribless, the outer acutely 3-angled, the inner rather terete, all truncate, tipped with a short, 3-4-lobed crown — April to June — Sandy places ; coast to middle region of coast range.

13. A. deserti, Boiss. ⊙ *Qurbayân.* .1 to .15, appressed-woolly-canescent, branching from neck ; stems erect or ascending. Leaves oblong to linear in outline, pinnatipartite into linear or oblong, obtuse, undivided or trifid, callous-tipped lobes. Peduncles elongated, not thickened. Involucre umbilicate, scales lanceolate, acute, the inner scarious at tip ; chaff oblong, narrow at base, acuminate, keeled ; rays white or pink ; akenes grooved, with tubercled ribs, bald or obsoletely margined — Sandy plains ; Arabia Petræa ; Qaldûn (Antilebanon).

14. A. Rasheyana, Boiss. ⊙ .05 to .1, appressed-hairy, ash-colored, erect, branching. Leaves oblong in outline, bipinnatisect into oblong, acute lobules. Heads small ; scales of involucre ovate to oblong, with a broad, scarious margin ; chaff oblong-lanceolate, obtusely toothed at tip ; *rays shorter than disk ;* akenes slender, cylindrical, grooved, bald or obsoletely margined — May — Dry hills between Rasheya and Damascus. Specimens collected on Tel Shîḥân, May 11, seem to belong to this species.

15. A. hyalina, DC. ⊙ .3 to .4, appressed-hirsute or glabrescent, divaricately branched. Leaves ovate in outline, tripinnatipartite into oblong, acute lobules. Peduncles *long*, at length thickened ; heads .03 broad ; scales of involucre *ovate to orbicular, with broad, scarious margin, buff-colored ;* chaff lanceolate, gradually tapering into a point ; *rays as long as disk or longer ;* akenes slender-pyramidal, *not furrowed, the outer at least furnished with a short, acute crown* — April to June — Fields ; lower and middle Lebanon, Antilebanon, and north-eastward.

16. A. melampodina, Del. ⊙ *Qurbayân.* .15 to .25, ash-colored, woolly, branching from neck. Leaves small, oblong in outline, 1-2-pinnatipartite into linear-oblong, mucronate lobules. Peduncles *short*, not thickened ; heads .02 broad ; scales of involucre hirsute, lanceolate to oblong, the outer acute, the inner scarious-tipped ; rays white, obovate-oblong, *longer* than disk ; outer akenes somewhat quadrangular, all furnished with an oblong, obtuse auricle, as long as they or longer — March to May — Deir 'Aṭîyeh ; Sinai to Egypt.

17. A. Haussknechtii, Boiss. et Reut. ⊙ .15 to .25, appressed-hairy, greyish-green, branching from neck ; branches ascending. Leaves ovate-oblong in outline, tripinnatipartite into short, linear to filiform, divergent lobules. Peduncles elongated, at length thickened ; heads .025 broad ; outer scales of involucre triangular-lanceolate, acute, inner oblong, obtuse ; chaff oblong-lanceolate, keeled, ragged-fringed at tip ; rays as long as disk ; akenes cylindrical, more or less tubercled, white, the marginal short, ribbed, thick, bald, those of disk with a truncate, ragged-toothed appendage as long as they — Spring — Fields ; Aleppo to Aintâb, Marash, and north-eastward.

18. A. Chia, L. ⊙ .2 to .3, glabrescent, branching from base ; stems erect or ascending. Leaves ovate in outline, bipinnatipartite into oblong, acute, divergent, often 2-3-fid lobules ; petiole fringed at base. Peduncles long, *not thickened ;* heads .03 broad ; scales of involucre with an undulating, scarious, rusty margin, the outer smaller, triangular, acutish, the inner linear-oblong, acute ; chaff oblong-linear, acutish, translucent ; rays longer than disk ; akenes cylindrical, ribbed, the outer somewhat curved, with a translucent auricle as long as they, the inner with a short auricle or a short, acute crown — January to May — Coast to 1,000 m. on coast range.

Var. **lasiolepis,** Post. Sparingly pubescent. Scales of involucre hirsute — Aintâb.

19. A. scariosa, DC. ⊙ .2 to .4, glabrous, branching from neck ; stems erect, sparingly branched. Leaves oblong in outline, bipinnatipartite into linear to subulate, acute, mucronate, simple or bifid lobules. Peduncles long, not thickened ; heads .04 broad ; scales of involucre tawny, scarious, translucent, the outer orbicular, the inner very broad, concave ; chaff linear-lanceolate, acuminate ; *rays orange ;* akenes somewat angular-terete, transversely tubercled, tip obtuse, bald — Spring — Beirût to Antilebanon, Damascus, Aleppo, Aintâb, and north-eastward.

20. A. cornucopiæ, Boiss. ⊙ .2 to .25, sparingly pubescent; stems erect or ascending, with few branches. Leaves obovate in outline, bipinnatipartite into linear, acute, mucronate lobules. Peduncles *elongated, not thickened ;* scales of involucre lanceolate, white-margined, acutish ; chaff oblong, mucronate ; akenes almost without ribs, turbinate, more or less tubercled ; auricle of outer akenes frequently as long as they, 2-3-parted, that of inner shorter, 2-3-lobed — Spring — plain of Esdraëlon ; Sarada (Merj 'Ayûn).

21. A. Hebronica, Boiss. et Ky. ⊙ .1 to .25, slightly hairy, branching from neck. Leaves small, ovate-oblong in outline, bipinnatipartite into oblong-linear, mucronate lobules. Peduncles slender, not thickened ; heads *scarcely larger than a pea ;* scales of involucre oblong-lanceolate, keeled, abruptly mucronate ; akenes *short-obpyramidal,* or nearly terete, truncate, *with a short, acute, repand margin,* tubercled below — Spring — Hebron ; Jericho ; flanks of Nebo.

22. A. Damascena, Boiss. et Gaill. ⊙ .05 to .1, canescent ; stems slender, simple, terminating in a rather long, at length thickened peduncle. Leaves small, oblong in outline, pinnatipartite into few, minute, oblong, mucronulate lobules. Heads medium ; outer scales of involucre lanceolate, inner oblong, obtuse, scarious at tip ; chaff oblong, obtuse, mucronate. Akenes slender-cylindrical, grooved, tapering at base, apex with a short, acute margin on one side — Spring — Damascus ; Antilebanon.

23. A. Cotula, L. ⊙ *Fuss-el-kilâb. Qahwân.* .4 to .6, glabrescent, corymbose. Leaves ovate-oblong in outline, bipinnatipartite into linear, entire or 2-3-toothed, mucronate lobules. Peduncles not thickened ; scales of involucre oblong, obtuse, with a narrow, scarious margin ; receptacle *long-conical ;* chaff linear-subulate ; akenes *caducous,* nearly terete, turbinate, *more or less tubercled, bald,* convex at tip, frequently with scalloped margin on account of the truncate ribs — Spring and summer — Common throughout.

24. A. Kahirica, Visiani. ⊙ .3 to .5, appressed-hairy, branching from base. Leaves ovate-oblong in outline, 2-1-pinnatipartite into very small, oblong-linear, prickly-toothed lobules. Peduncles not thickened ; scales of involucre oblong, obtuse, with broad, scarious margin ; receptacle *hemispherical, all chaffy*, chaff linear, akenes *not tubercled*, nearly terete, tapering at base, grooved, truncate, bald — Spring — Convent of St. Catherine (Sinai) to middle and upper Egypt.

25. A. pseudocotula, Boiss. ⊙ .3 to .4, appressed-puberulent, corymbose. Leaves ovate-oblong in outline, bipinnatipartite into oblong-linear, acute lobules. Peduncles *at length thickened ;* outer scales of involucre lanceolate, inner linear-oblong, long-scarious at tip; receptacle *conical ;* chaff linear ; akenes *persistent*, furrowed, the outer somewhat obpyramidal, smooth or slightly tubercled at ribs, the inner obconical-terete, not tubercled, terminating in a concave, entire or somewhat lobed margin — Spring — Coast ; Damascus ; Jordan Valley.

26. A. rotata, Boiss. ⊙ .08 to .12, appressed-hairy, branching from neck. Leaves small, oblong in outline, bipinnatipartite into *triangular-linear*, acute lobules. Peduncles *short, at length much thickened ;* scales of involucre oblong, the inner scarious-margined ; receptacle *ovate ;* chaff linear-awl-shaped ; akenes *persistent*, sulcate, ribbed, tubercled at ribs, the outer nearly quadrangular, the inner obconical ; the tip of all truncate, *radiate-lobed* — Spring — Sinai to Egypt.

27. A. Tripolitana, Boiss. ⊙ .3 to .4, sparingly appressed-puberulent, branching from neck. Leaves oblong-spathulate in outline, tripinnatipartite into short, oblong-linear, mucronate lobules. Peduncles long, *at length thickened ;* scales of involucre oblong-linear, obtuse, scarious-margined ; receptacle conical ; chaff awl-shaped ; outer akenes persistent, thicker, shorter, rather pithy, coarsely-grooved and tubercled, *with an entire or 3-toothed or lobed auricle often as long as they, turned inward at a right angle*, inner akenes more slender, rather smooth, with a smaller auricle — Spring — Sandy fields ; coast.

34. CHAMÆMELUM, Visiani. CHAMÆMELUM.

Heads many-flowered, radiate or discoid. Involucre imbricated, scales more or less scarious. Receptacle convex or conical. Akenes nearly alike, obpyramidal or somewhat compressed, crowned or bald, 2-furrowed and 3-ribbed at inner face, convex and ribless or rarely 1-2-ribbed at back — Perennial herbs with finely dissected leaves.

* *Annuals.*

1. Ch. præcox, M. B. ⊙ Sparingly pubescent or glabrous ; stems short, ascending. Leaves oblong, pinnatisect into short, filiform, subulate lobules, those of stem sessile ; branches 1-headed, naked above. Heads rayed ; scales of involucre obtuse, rusty-scarious at margin ; receptacle conical ; akenes *with* 2, *slender ribs at back, and* 2, *small glands at tip ;* crown obtusely lobed, one-third to one-half as long as akene — March and April — Hills and fields ; Aleppo.

2. Ch. inodorum, L. ⊙ Glabrous ; stems erect or diffuse, branching. Leaves bipinnatisect into linear, diverging, acute lobules ; branches leafy to near tip. Scales of involucre obtuse, scarious-

margined ; receptacle long-conical ; akenes thick-ribbed, transversely wrinkled ; crown short — Spring — Gennesaret (Tristram).

3. Ch. auriculatum, Boiss. ⊙ .1 to .2, glabrescent ; stems 1-headed, scape-like. Leaves pinnatisect into linear, entire or pinnate-lobuled segments. Heads .008 broad ; scales of involucre ovate-oblong, scarious-margined ; receptacle ovate ; akenes small, inner face thick-ribbed and deeply furrowed ; auricle oblong, translucent, as long as akene or longer — March and April — Sandy places ; et-Tîh ; about Dead Sea ; Syrian desert.

* * *Perennials.*

4. Ch. grandiflorum, Boiss. et Haussk. ♃ .2 to .5, sparingly appressed-pubescent ; stems numerous, ascending, 1-headed. Root-leaves *linear-oblong* in outline, tripinnatisect into linear, crowded, acute lobules ; those of stem sessile, pinnatisect. Head .035 broad ; scales of involucre oblong, obtuse, margin rust-colored, wavy ; akenes oblong, *finely striate at back*, 3-ribbed at face ; auricle white, crenate, one-third as long as akene — March and April — Antilebanon ; Jebel Muḥassan near Aleppo ; Aintâb.

5. Ch. oreades, Boiss. ♃ .2 to .4, more or less pubescent, clumpy, many-stemmed ; stems ascending, usually 1-headed. Leaves *oblong* in outline, 2-pinnatisect into linear, acute lobes ; stem-leaves small, sessile. Heads .025 broad, radiate ; scales of involucre oblong, obtuse, rusty-scarious at margin ; akenes short, compressed, ribless at back, 3-ribbed at face ; auricle crenate-lobed, white, one-third to one-fourth as long as akene — Spring — Rocky places ; Lebanon and Antilebanon to Damascus, Aleppo, and northward.

35. ORMENIS, Cass. Ormenis.

Heads many-flowered, rayed, rays bearing styles but sterile ; disk-flowerets perfect, 5-toothed ; tube of ray-flowerets 2-winged at base, with 2, short spurs, that of disk-flowerets winged, the base at inner side produced in the form of an oblong-lanceolate horn enveloping the akene ; receptacle conical, chaffy. Akenes obovate, rather compressed, tip rounded, bald ; outer face ribless, inner with 3, filiform ribs — Annual herbs with aspect of Anthemis.

O. mixta, L. ⊙ .3 to .5, pubescent, erect, diffusely branched. Lower leaves oblong-spathulate to oblong-linear in outline, bipinnatisect into linear-lanceolate, mucronate lobules, upper leaves pinnatifid-serrate, all with a broad rachis. Heads .02 broad ; scales of involucre oblong, obtuse, margin scarious — Spring — Fields ; coast, lower mountains and interior plains.

36. CHRYSANTHEMUM, L. Chrysanthemum. *Adharyûn.*

Heads many-flowered, rayed, ray-flowerets strap-shaped, pistillate or sterile. Involucre imbricated, scales scarious at margin. Receptacle naked, convex. Akenes of two kinds, those of rays more or less triquetrous or 3-winged, those of disk turbinate. Pappus crown-like or 0 — Annual herbs, with .03 to .04 broad, yellow flowers.

* *Akenes ending in a broad crown.*

1. Ch. Myconis, L. ⊙ .3 to .8, glabrescent ; stems thickish, simple or branched. Leaves serrate, the lower petioled, obovate-cuneate

obtuse, the rest half-clasping at base, the uppermost linear-lanceolate — April to July — Fields ; coast and lower mountains and interior plains.

* * *Akenes bald.*

2. Ch. segetum, L. ⊙ .3 to .6, glabrous, glaucescent ; stem simple or branched. Leaves tapering at base, coarse-toothed or pinnatifid into oblong, dentate lobes, the upper leaves oblong to lanceolate. Akenes of rays broad, somewhat compressed, triquetrous, with broader marginal ribs, those of disk turbinate, *equally* 10-*ribbed* — April and May — Fields ; coast, and lower mountains, and interior plains.

3. Ch. coronarium, L. ⊙ .3 to .8, glabrous ; stem erect, branching, leafy. Lower leaves tapering at base, upper half-clasping, *all bipinnatisect into acutely toothed, lanceolate lobes, rachis dentate-lobed.* Rays obovate-oblong ; akenes grooved, tubercled, those of disk compressed-4-angled, with a narrow wing at inner side — April to June — Fields ; coast and lower mountains, and interior plains ; Valley of Rephidîm (Sinai).

4. Ch. viscosum, Desf. ⊙ .5 to .6, *viscid-puberulent ;* stem corymbose, rarely simple. Lower leaves tapering at base, oblong, pinnatifid into short, obtuse, denticulate lobes ; upper leaves half-clasping, oblong-lanceolate, dentate. Akenes obsoletely grooved, wings of the outer terminating at tip in *a triangular, oblique tooth*, those of disk *much flattened, dilated at inner side into a prickly-tipped wing* — Spring — Coast near Jaffa.

37. PYRETHRUM, Gærtn. PYRETHRUM. *Qa'indest.*

Heads many-flowered, rayed or discoid, sometimes with marginal flowerets in 1 row, strap-shaped, sometimes with flowerets all perfect, 3-4-toothed. Scales of involucre imbricated, herbaceous, more or less scarious at margin. Receptacle naked, punctate, slightly convex or hemispherical, Branches of style short, truncate, brush-like at tip. Akenes uniform, prismatic or turbinate, equally ribbed and grooved, all crowned ; crown dentate, sometimes half as long as akene, sometimes very short — Perennial herbs, sometimes woody at base.

* *Heads .03 broad, radiate. Rays white, longer than disk.*

1. P. Cassium, Boiss. ♃ 1 or more ; stem loosely corymbose. Leaves oblong in outline, bipinnatisect into oblong-lanceolate, entire or dentate lobes ; the lower leaves petioled, the upper sessile, small. Peduncles .1 to .2 long ; crown as long as akene — June — Woods at base of Cassius.

* * *Heads .005 broad, radiate. Rays white, shorter than disk.*

2. P. Cilicicum, Boiss. ♃ 1 or more ; stem leafy, densely corymbose. Leaves 1-2-pinnatisect into oblong, entire or dentate lobes. *Corymbs many-flowered ;* crown short, ragged — June — Woods ; subalpine Lebanon, and lower and middle regions of Cassius, Amanus, and northward.

* * * *Heads .008 broad, radiate. Rays yellow, shorter than disk.*

3. P. densum, Labill. ♄ .2 to .4, velvety-canescent ; stems simple, erect, rigid. Leaves .02 to .03 long, *elliptical* in outline, pin-

natisect into *oblong*, obtuse lobules *connected by pannous wool. Corymbs of few heads;* crown very short — July and August — Alpine Lebanon, and Antilebanon to Amanus, Akherdagh, and northward.

* * * * *Heads* .005 *to* .008 *broad, discoid, yellow.*

† *Heads with two kinds of flowerets, the marginal pistillate,* 3-*dentate.*

4. P. tenuilobum, Boiss. ♃ .15 to .25, herbaceous above, sparingly hairy; stems usually corymbose. Leaves *oblong-linear* in outline, .05 to .1 long, bipinnatipartite into *linear-subulate lobules;* primary segments ovate, 12-15 on each side. Corymb with few heads, *as large as* peas; akenes with a short crown — June to August — Alpine Lebanon and Antilebanon.

5. P. santolinoides, DC. ♄ *Murr.* .3, crisp-velvety; stems slender, wand-like, rather rigid, leafy below, 3-7-headed. Leaves linear-oblong, bipinnatisect into *orbicular-spathulate, decurrent lobules;* primary segments small, *linear.* Peduncles .1 or more long: crown very short — May — Rocky places; Sinai.

† † *Heads with only perfect,* 5-*toothed flowerets.*

6. P. argenteum, Willd. ♃ .3 to .4, appressed-silky, tufted: stems ascending, leafy at base. Leaves *ovate in outline,* bipinnatisect into oblong-linear, obtusish lobules, primary segments 5-7, lobules 3-7 in each segment; the upper leaves much smaller. Corymb compact, *many-headed;* pedicels shorter than ovate-obconical heads; akenes with 4-5, prominent ribs; crown long-toothed — August —

Var. **tenuisectum,** Boiss. Lobules of leaves *linear* — Alpine Lebanon above Cedars and Ehedîn.

7. P. leucophyllum, Boiss. et Haussk. ♃ .3 to .45, woody at base, many-stemmed, *densely pannous.* Leaves ovate-cuneate, *fan-shaped, parted into* 3 *segments,* subdivided into 3-5, obtuse, entire or 3-toothed lobules; upper leaves very small, *linear-spathulate,* nearly entire. Corymb dense, many-headed, nearly umbelled; pedicels *about as long as small, ovate heads;* akenes few ribbed, with a long-toothed crown — Summer — Subalpine Amanus.

38. MATRICARIA, L. Feverfew. *Bâbûnij.*

Heads many-flowered, radiate heterogamous, or discoid homogamous. Involucre imbricated, scales scarious. Receptacle conical, naked. Akenes nearly terete, back ribless, inner face with 3-5, slender ribs, often bald or crowned in the same species — Annual aromatic herbs, with finely dissected leaves, and rays, when existing, white.

* *Heads radiate.*

1. M. Chamomilla, L. ⊙ .2 to .4, glabrous, branching from neck; stems erect or diffuse. Leaves bipinnatipartite into linear-setaceous lobules. Heads .01 broad; receptacle *long-conical, hollow;* akenes bald, inner face 5-ribbed — May and June —

Var. **coronata,** J. Gay. Akenes of rays or of all flowerets with a long, lobed crown — Coast to mountains at height of 1,000 m., and interior table-lands.

* * *Heads discoid.*

2. M. aurea, L. *Bâbûnij* ⊙ .1 to .25, branching from neck ; stems slender, ascending. Leaves pinnatipartite into setaceous, entire or 3-fid lobules. Heads .005 broad ; receptacle *ovate*, akenes minute, bald, or with an oblique ear-like crown — Spring — Common throughout, even in deserts. A fragrant plant, the infusion of which is much used as a febrifuge and carminative.

39. BROCCHIA, Visiani. BROCCHIA. *Afrach. Sekrân. Qurbayân. Qurbiyân.*

Heads many-flowered, discoid, homogamous. Involucre imbricated, scales shorter than disk. Receptacle hemispherical, naked, papillose. Flowerets all perfect, corolla-tube translucent, compressed, limb 4-toothed. Akenes obovate-oblong, somewhat compressed, striate, apex rounded, bald — Annual herbs with aspect of Cotula, distinguished from Pyrethrum by the bald akenes, and 4-lobed corolla.

B. cinerea, Del. ⊙ .1 to .25, grey-velvety, branching from neck ; stems ascending, simple or sparingly branched. Leaves .01 to .015 long, wedge-shaped, pinnatifid or toothed toward tip. Heads .005 broad — February to May — Et-Tîh to Sinai, and Egypt.

40. ARTEMISIA, L. WORMWOOD. *Bu'aiterân. Ḥabaq-er-Ra'i.*

Heads discoid, homogamous or heterogamous, the marginal flowerets in 1 row, pistillate, with a deeply 2-cleft, exserted style ; disk flowerets perfect, fertile, or sterile by abortion of ovary. Involucre imbricated, scales scarious at margin. Receptacle naked or hairy. Anthers ending in a stiff, somewhat awl-shaped, rarely oblong point. Akenes obovate, ribless, bald — Shrubs or herbs, with or without woody base, with small, commonly panicled heads.

* *Receptacle naked.*

† *Flowerets of rays pistillate, of disk perfect, sterile. Perennials.*

1. A. monosperma, Del. *'Adah.* ♃ .5 to .7, glabrous ; stems thick, ascending, diffuse or erect, ending in a long, pyramidal, many-flowered panicle. Leaves of sterile shoots pinnatisect, of stem short, frequently clustered, simple, linear, or trisect into linear lobes. Heads crowded, short-pedicelled, nodding, ovate, few-flowered ; involucre glabrous, scales gradually enlarging from without inward, *the outer orbicular*, the inner oblong ; pistillate flowers 2, perfect 8-10, seed usually 1 — August to November — Coast to et-Tîh, Sinai, and Egypt.

† † *Heads homogamous. Perennials.*

2. A. Herba-Alba, Asso. ♃ *Shîḥ. Ghureirah.* .3 to .5, more or less woolly-canescent, branching from base, stems ending in an oblong panicle, with spreading, rigid branches. Leaves of sterile branches petioled, ovate-orbicular in outline, bipinnatipartite into oblong to oblong-linear lobes, those of fertile branches much smaller, few-lobed and clustered ; bracts very small, ovate. Heads sessile, oblong, 2-4-flowered ; outer scales very small, orbicular, concave, inner oblong to oblong-linear, larger — September to December — Dry places ; table-lands and deserts of interior, especially in salty ground.

Var. **densiflora,** Boiss. Heads more or less crowded along the erect or forked branches of the panicle — Damascus ; Antilebanon ; Syrian desert.

Var. **laxiflora,** Boiss. Stems slender. Branches of the panicle slender, spreading. Flowers more scattered — Sinai ; Palestine ; Damascus.

† † † *Ray flowerets pistillate, those of disk perfect, all fertile.*

3. A. Judaica, L. ♄ *Bu'aiterân.* .5 to .7, tomentellous-canescent, branching into a spreading, compound, pyramidal panicle. Leaves of sterile branches petioled or sessile, obovate-cuneate, 1-2-pinnatifid or parted, primary segments parted into 3-7, ovate-oblong to oblong, entire or obtusely-toothed lobes, leaves of flowering branches minute, clustered. Heads hemispherical, .003 broad, nearly sessile, in dense racemes along the branches of the panicle ; scales of involucre ovate — March and April — Sinai to Egypt.

4. A. annua, L. ⊙ *Bu'aiterân.* .5 to 1, glabrous ; stem erect, furrowed, ending in a large, compound panicle. Root-leaves long-petioled, triangular-ovate in outline, bipinnatisect into oblong, acutely dentate lobules, the primary axis toothless ; floral leaves smaller, lobes linear-setaceous. Heads .002 broad, globular, *nodding ;* scales of involucre glabrous, few, the outer oblong-linear, the inner nearly orbicular — Autumn — Palmyrene desert ; plain of Issus ; Aintâb.

* * *Receptacle hairy. Ray-flowerets pistillate, disk flowerets perfect, all fertile.*

5. A. arborescens, L. ♄ *Dhoqn-esh-Sheikh.* .5 to 1, silky-canescent ; stems erect, shrubby, ending in a narrow panicle. Leaves broad-ovate in outline, 2-3-pinnatipartite into linear lobes. Racemes loose, one-sided ; heads .005 broad, globular ; pedicels as long as heads or shorter ; scales of involucre obtuse, the outer oblong, the inner ovate — May to August — Damascus ; Carmel.

A. campestris, L., *A. crithmifolia,* L., and *A. maritima,* L., are said by Tristram to be found along coast. They have not been reported by others.

41. TUSSILAGO, L. Coltsfoot.

Heads radiate. Marginal flowerets in several rows, pistillate, strap-shaped, entire ; disk-flowerets perfect, tubular, 5-toothed. Involucre simple, somewhat cup-shaped. Receptacle naked. Stigmas linear. Pappus composed of five bristles, that of ray-flowerets in many rows, of disk flowerets in one row. Perennial herbs, with scape-like, 1-headed stems, and yellow flowers.

T. Farfara, L. ♃ Root-leaves more or less cobwebby underneath, cordate-orbicular, angular-toothed, those of stems scale-like, oblong-lanceolate — March to June — Coast to subalpine Lebanon, Antilebanon, Marash, and northward.

42. DORONICUM, L. Doronicum.

Heads many-flowered. Marginal flowerets strap-shaped, in 1 row, pistillate ; disk-flowerets perfect, tubular. Scales of involucre in 2-3

rows. Receptacle convex, more or less hirsute. Styles of perfect flowerets truncate, tasseled at tip. Akenes beakless, furrowed and ribbed, those of margin bald, those of disk with hairy pappus — Perennial herbs, with large, yellow flowers.

D. Caucasicum, MB. ♃ .5 to .7, glabrescent ; stem erect, 1-headed. Root-leaves petioled, cordate-orbicular, repand or crenate ; stem-leaves 1-2, sessile, cordate-clasping, ovate to oblong. Flowers .05 broad ; rays about as long as somewhat bristly involucre — Spring — Subalpine and alpine Lebanon, and Nusairy Mountains.

43. SENECIO, L. Groundsel.

Heads usually heterogamous. Marginal flowerets strap-shaped, in one row, pistillate ; disk-flowerets perfect, tubular. Heads rarely discoid, with flowerets all alike, tubular. Involucre cup-shaped, scales in 1 row, sometimes with squamules at base. Receptacle flat, naked. Styles of perfect flowerets truncate, tasseled at tip. Akenes beakless, furrowed and ribbed, all with hairy, commonly deciduous pappus in more than 1 row. Herbs, annual, biennial, and perennial, growing in moist places, rarely woody at base ; flowers yellow.

* *Annuals. Stem-leaves more or less divided, auricled at base.*

† *Rays none, or barely longer than involucre.*

1. S. Decaisnei, DC. ⊙ *Murûrah. Aṣâbi'-el-'Arûs. Hammâḍ-Bahâyim.* .2 to .4 ; stem erect, forked, rarely simple. Leaves rather fleshy, the lower ovate-oblong, toothed, short-petioled, those of stem cordate-clasping at base, irregularly toothed. Heads *discoid*, obconical-cylindrical, .01 long, .004 broad ; pappus caducous, longer than akenes — Spring — Rocks and sandy places ; Dead Sea to Sinai and Egypt.

2. S. vulgaris, L. ⊙ .1 to .3. Lower leaves oblong-spathulate, toothed, tapering into a short petiole, the rest half-clasping at base, oblong, pinnatifid or parted into remote, oblong, obtuse, unequally dentate lobes. Heads corymbed, crowded or loose, nodding, .007 long, .004 broad, obconical-cylindrical, *discoid*, short-rayed ; akenes tapering above, shorter than pappus — November to March — Coast.

† † *Rays longer than involucre, or* 0.

‡ *Akenes pubescent or puberulent.*

3. S. leucanthemifolius, Poir, ⊙ .2. Leaves oblong, pinnatifid into oblong, dentate lobes. Heads *oblong*, rayed, .005 long, .003 broad ; akenes short ; pappus as long as disk — November to April — Coast.

Var. **discoidea,** Post. Rays 0 — Coast, along with type.

4. S. vernalis, W.K. ⊙ .2 to .6. Leaves oblong, sinuate to pinnatifid into oblong, toothed lobes. Heads *cup-shaped*, .01 to .015 long and broad ; *rays as long as involucre or longer ;* pappus *persistent*, as long as disk — November to May — Common throughout.

Var. **carnosus,** Post. Leaves fleshy, more dissected ; heads .015 long and broad — Sands ; Jaffa.

Var. **nanus**, Boiss. Stems .03 to .1 high ; heads few, small — Alpine Antilebanon.

5. S. coronopifolius, Desf. ⊙ *Qurâ'î. Jerjîr. Mureir.* .1 to .25. Leaves fleshy, pinnatipartite into *linear*, remotely toothed lobes, the lower tapering into a short petiole, the rest clasping, with minute auricles. Heads cup-shaped, .01 long and broad, in loose corymbs with rather long peduncles — Spring — Common.

‡ ‡ *Akenes glabrous.*

6. S. exilis, Blanche. ⊙ .1, somewhat viscid ; stem corymbose from base. Leaves *small*, the radical oblong, entire, tapering to a petiole, the others linear, sinuate to pinnatifid, with linear lobes, auricled at base. Heads cup-shaped, .006 to .01 long and broad — September — Top of Jebel Makmel, near the melting snow.

* * *Biennials or perennials. Leaves incised, pinnatifid, lyrate, or sublyrate-cordate. Heads small or medium.*

7. S. erraticus, Bertol. ② 1 or more, *glabrescent*, erect, dichotomous-corymbose. Lower leaves lyrate, the terminal lobe ovate, often subcordate ; stem-leaves clasping, auricled at base, pinnatipartite, the terminal segment wedge-rhomboid. Heads .005 long, .01 broad ; scales at base of involucre about 2, *minute;* akenes *glabrescent*, pappus of *few* bristles — Summer — Wet places ; Galilee ; Ghautah (Damascus).

8. S. mollis, Willd. ⊙ 1 or more, appressed-canescent, cobwebby ; stem erect, ending in a loose, compound corymb. Leaves oblong, toothed-lobed, sometimes nearly lyrate, the upper clasping. Heads hemispherical, .005 in diameter ; scales at base of involucre 6-8, *subulate*, one-third as long as involucre ; rays as long as involucre ; akenes all *silky;* pappus of *many* bristles — Summer — Aintâb to Marash, and northward.

* * * *Perennials. Leaves entire. Tall, glabrous, alpine herbs.*

9. S. doriæformis, DC. ♃ .5 to 1 or more ; stems many, erect, grooved, leafy, simple or branching from the upper axils. Leaves thickish, entire or crenate-toothed, the lower ovate-oblong, petioled, the upper ovate-lanceolate to lanceolate, sessile. Heads .015 long, .01 broad ; rays once and a half as long as pappus ; akenes glabrous ; pappus twice as long as involucre — July to September — Subalpine and alpine Lebanon and Antilebanon to Akherdagh.

Var. **megalophron,** Boiss. Upper leaves lanceolate to lanceolate-linear — With type.

44. CALENDULA, L. CALENDULA. *Kahleh.*

Heads many-flowered, radiate, heterogamous. Involucre imbricated in about 1 row, scales nearly equal. Rays strap-shaped, pistillate, fertile ; branches of style linear. Flowerets of disk tubular, perfect, 5-cleft, sterile, stigma capitate. Akenes in 2 to 3 rows, curved, of different forms, the outer prickly at back — Perennial, biennial, or annual herbs, with orange-colored or yellow rays.

* *Perennials or biennials.*

1. C. sinuata, Boiss. et Gaill. ♃ ② .2, more or less appressed-cobwebby ; stems woody at the procumbent base ; leaves somewhat wavy-margined, sinuate-repand, the lower oblong-spathulate, the upper linear-lanceolate, acute, somewhat auricled at base. Rays yellow,

more than twice as long as involucre ; marginal akenes linear-cylindrical, beaked, prickly at back, semicircular, the intermediate ovate, boat-shaped, inflated, with a concave, membranous margin, the inner ring-shaped — Spring — 'Aleih (Lebanon) ; Damascus.

* * *Annuals. Leaves oblanceolate to oblong-lanceolate, repand-toothed, more or less clasping at base.*

2. C. Palestina, Boiss. ⊙ .2 to .5, somewhat roughish, glutinous ; branches erect. Heads .015 broad ; rays twice as long as involucre ; marginal akenes with .02 to .025 long beaks, 3-4 times as long as involucre, frequently crested-toothed at margin ; intermediate much inflated, boat-shaped ; inner ring-like, prickly at back — Spring — Fields ; coast and lower mountains, and interior plains.

Var. **brachyrrhyncha,** Boiss. Beak of outer akenes short, as long as seed or shorter — Jerusalem.

3. C. arvensis, L. ⊙ .2 to .4, pubescent ; stems erect or decumbent. Heads .015 broad, about twice as long as involucre ; outer akenes beaked, once and a half to twice as long as involucre ; intermediate inflated, boat-shaped ; inner ring-like, wrinkled at back — Spring — Fields ; common throughout. Grows to a gigantic size in Jordan Valley (Tristram).

4. C. Persica, C. A. M. ⊙ .1 to .5, papillose-glutinous, branching from neck. Heads .008 to .01 broad, rays once and a half as long as involucre ; *akenes all ring-like*, prickly at back, winged at face, three times as large as the wrinkled, inner ones — Spring — Southern and western borders of et-Tîh.

Var. **gracilis,** Boiss. Akenes more nearly equal, the outer twice or less than twice as large as inner, not crested at margin, frequently only roughened at back — Tripoli ; Damascus ; Aleppo.

5. C. Ægyptiaca, Desf. ⊙ .2 to .5, papillose-hairy, glutinous. Heads hardly .01 broad, few-flowered ; rays papillose-hairy at base, hardly longer than involucre ; marginal akenes long-prickly at back, ending in a slender beak *as long as or longer than* seed ; intermediate winged-crested or boat-shaped ; inner ring-like, wrinkled — Spring — Common to alpine regions.

Var. **suberostris,** Boiss. Marginal akenes winged-inflated, beak short or 0 ; intermediate beakless — Borders of deserts in southern Palestine ; Lattakia.

45. DIPTEROCOME, Fisch et Mey. DIPTEROCOME.

Heads few-flowered, heterogamous. Flowerets all tubular, those of margin pistillate, short, funnel-shaped at tip, almost 2-lipped, the posterior lip very short, 2-3-toothed, much smaller than the anterior ; disk-flowerets 5-toothed, staminate. Filaments monadelphous, anthers nearly free, muticous at base, appendaged at apex. Style of pistillate flowers bifid, of staminate thickened at tip, nearly entire. Akenes either cylindrical, curved, prickly at back, with 2, recurved, prickly-margined horns at tip, or of two forms, the outer longer, less curved, not horned, with radiating prickles at tip. Pappus of the horned akenes composed of a few, spreading, scabrous bristles.

D. pusilla, F. et M. ⊙ .03 to .06, glabrescent. Leaves sessile, linear, muticous. Heads 10-15-flowered — Spring — Damascus to Palmyra, and north-eastward.

46. TRIPTERIS, Less. TRIPTERIS.

Heads many-flowered, rayed, heterogamous. Involucre in 1 row, scales equal. Ray-flowerets strap-shaped, pistillate, fertile, branches of style linear. Disk-flowerets tubular, five-toothed, perfect, sterile, style undivided. Akenes 3-angled, 3-winged, with a short beak often ending in an aperture closed by a membrane ; inner akenes often wingless — Herbs or shrubs, with yellow flowers.

T. Vaillantii, Dec. ♄ .3 to .5, glandular-hirsute. Stem-leaves oblong-lanceolate, toothed, half-clasping. Heads small, peduncled ; scales of involucre linear ; akenes, including wings, .008 long, oblong-spathulate, wings somewhat broader than the minutely tubercled seed — Sinai.

47. GUNDELIA, Tourn. GUNDELIA. *'Akkûb.*

Headlets of 5-7 flowerets, subtended by a prickly bract of the compound head, connate with the prickly, united scales of the involucre, the central floweret of each headlet fertile, the others sterile. Anthers long, linear, base obtusely sagittate. Style somewhat hispid, branches thick, flat, cylindrical. Akenes large, somewhat compressed-tetragonal, tapering at base, tipped with a spongy, minutely toothed cup. The common involucre of each headlet growing, and united into a leathery, obpyramidal body, spiny at tip, and falling at maturity — Milky, prickly herbs, with aspect of *Eryngium*.

G. Tournefortii, L. ♃ *'Akkûb. Ka'ûb. Ku'aib.* .4 to .5 ; stems thick, simple, or with a few, short, corymbose branches above. Leaves leathery, rigid, very thick, with prominent veins, oblong to oblong-lanceolate, pinnately lobed or parted, spiny-toothed — Spring — Fields and waste places ; common from coast to middle and subalpine regions, and interior plains.

Var. **tenuisecta,** Boiss. Leaves nearly pinnately parted, with little parenchyma — Akherdagh, and northward.

48. ECHINOPS, L. ECHINOPS. *Badaward. Shauk-el-Jemâl.*

Headlets mumerous, sessile on the common receptacle of a dense, globular head, which is subtended by a reflexed involucre, concealed by the heads, and composed of a few scales or bristles. The involucre of the headlets in several rows, the outermost scales bristle-like, pinnate, forming a *pencil*, the rest gradually elongated from the outer spathulate to the inner subulate or needle-tipped scales, the innermost free or united. Corolla regular, tube slender, 5-parted. Anthers appendaged at base. Style surrounded by a ring of hairs beneath its branches. Akenes elongated, nearly terete, generally villous. Bristles of pappus more or less united, chaffy, forming a crown — Thorny herbs, more or less cobwebby or canescent.

* *Scales of partial involucre more or less united.*

† *Scales of partial involucre all glabrous.*

1. E. glaberrimus, DC. ♃ *Khashîr.* .6, glossy, glabrous, except slightly cobwebby, under face of leaves ; stem slender, simple, 1-headed. Leaves *rigid, prominently nerved, lanceolate,* pinnatipartite into small, ovate-oblong segments, with crowded, spiny lobes. Pencil half as long as involucre ; scales of involucre about 16 ; chaff of pappus *short, free* — Summer — Sinai and et-Tîh.

† † *Outer scales of involucre at least usually woolly or glandular, some of them produced into horns.*

2. E. spinosus, L. ♃ *Shauk-el-Jemâl.* 1 or more, *not glandular.* Leaves pinnatipartite into linear-lanceolate or subulate, prickly lobes, with revolute margins. Heads .05 broad ; pencil as long as involucre, composed of scabrous bristles ; scales of involucre 18-20 ; bristles of pappus chaff-like, *united for one-third of their length ;* involucre of upper, sterile headlets furnished with a strong horn, often .04 long — Summer — Syria (place not noted ; Boissier).

3. E. viscosus, DC. *Qarqafân. Qutât. Mar'âwîleh. Shauk-el-Jemâl.* 1 to 1.5 ; stem reddish or white, glabrescent, or *rough with more or less copious, red, glandular bristles.* Leaves greenish, and beset with glandular bristles at upper face, canescent at lower, 1-2-pinnatisect into lanceolate, spiny lobes. Heads .05 broad ; pencil one-third to one-half as long as involucre ; scales of involucre 20-22 ; bristles of pappus chaff-like, united at base ; one scale of the involucre of the upper headlets sometimes elongated into a horn — Summer and autumn — Fields ; common from coast to subalpine regions, and interior plains.

Var. **Gaillardoti,** Post. Heads smaller. Involucre .01 long. (*E. Gaillardoti, Boiss.*).

Var. **Blancheanus,** Post. Leaves with linear-subulate lobes, revolute margins, and long prickles. Heads as in type or in Var. Gaillardoti. (*E. Blancheanus, Boiss.*).

* * *Scales of partial involucre all free.*

4. E. vaginatus, Boiss. et Haussk. ♃ .5 to 1, glandless ; stem stout, terete, appressed-woolly-canescent. Leaves coriaceous, green at upper surface, cobwebby-canescent at lower, the radical oblong-lanceolate, pinnatisect into triangular-lanceolate, 3-5-fid, long-prickly segments, *the short petiole bordered on each side by a flat, linear-oblong, striate wing, with prickly-pectinate margin,* those of stem ovate-oblong, sessile, prickly-dentate, *the uppermost hooded.* Heads .08 in diameter ; pencil more than half as long as involucre, composed of feathery scales; scales of involucre 13-14 ; bristles of pappus *united for one-fourth of their length* — September — Alpine regions of Akherdagh, and northward.

5. E. sphærocephalus, L. ♃ 1 or more ; stem grooved, canescent and setulose-glandular. Leaves soft, green at upper surface, viscid-hirtellous, canescent at lower surface, lanceolate, pinnatifid into oblong, triangular, lobed, prickly segments. Pencil somewhat more than half as long as involucre ; scales of involucre about 16, viscid-puberulent ; bristles of pappus *united to beyond their middle* — Summer —Gennesaret (Tristram).

6. E. Ritro, L. ♃ .5 to 1, glandless ; stem terete, canescent, usually corymbose above. Leaves glabrescent or somewhat cobwebby-fleecy at upper surface, canescent at lower, oblong, 1-2-pinnatisect into lanceolate, slender, prickly lobes. Pencil *one-third to one-fourth* as long as involucre ; scales of prismatic involucre about 20 ; bristles of pappus *united nearly to middle* — September — Kai-Pok-Dagh (Amanus) to Akherdagh, and northward.

Var. **minimus,** Post. .3 to .4 high. Heads .02 to .025 in diameter — Kai-Pok-Dagh (Amanus).

49. ACANTHOLEPIS, Less. Acantholepis.

Headlets collected into a hemispherical head, all erect, sessile on a common receptacle, which is surrounded by a long, spreading involucre in several rows. Involucre of the headlets in several rows, the outer row forming a pencil of branching bristles, the intermediate and inner changing gradually into oblong scales with pectinate, bristly margins and aristate tips, all fleecy, free. Corolla regular, tube short, limb cylindrical, 5-parted. Anthers with a short, barbed appendage at base. Base of branches of style surrounded by hairs. Akenes villous ; pappus chaffy, united at base — Low, annual, desert herbs.

A. Orientalis, Less. ⊙ .05 to .2, fleecy, corymbose. Leaves linear-lanceolate, entire or prickly at margin. Heads .02 in diameter, as broad as involucre — June and July — Ḥaurân to Qaryetein, Palmyrene desert, and northward.

50. CARDOPATIUM, Juss. Cardopatium.

Heads homogamous, with few, equal flowerets. Involucre in several rows, scales leathery, all except the inner ones pectinate-prickly. Receptacle small, covered with fringed chaff. Limb of corolla 5-parted. Filaments glabrous ; anthers ending in a long, fringed appendage. Akenes ovate, silky-villous, erect, with basilar hilum and obtuse tip. Pappus persistent, chaffy, in 1-2 rows of needle-pointed, nearly free pales — Spiny herbs with very numerous, sessile heads, crowded into terminal, dense, corymbose clusters, subtended by crowded, spiny bracts.

C. corymbosum, L. ♃ .2 to .3 ; stem 2-3-forked above. Root-leaves long, linear-oblong in outline, 1-2-pinnatisect into oblong, spiny-serrate lobes ; stem-leaves narrower, smaller. Heads ovate-conical, 8-10-flowered, .01 long, .007 broad ; involucre spreading, scales linear, keel-shaped, prickly-margined — May to July — Dry fields and hills ; coast and lower mountains and interior plains.

51. XERANTHEMUM, L. Xeranthemum.

Heads heterogamous, outer flowers few, neutral, with a small, 2-lipped corolla, the rest tubular, with a 5-cleft-limb. Scales of involucre imbricated, scarious. Receptacle with narrow, concave chaff, each pale subtending one flower. Filaments free, glabrous ; anthers caudate at base. Akenes appressed-hairy, tapering at base, slender-turbinate, hilum at base. Pappus chaffy, pales 5-15, in one row, tapering-aristate, united at base — Annual, unarmed, appressed-canescent herbs, with elliptical to oblong-linear leaves.

1. X. annuum, L. ⊙ Stem forked. Heads hemispherical-ovate, 100-120-flowered ; scales of involucre glossy, the outer ovate, imbricated, abruptly mucronate, the inner *thrice* as long, pink, ray-like, ellipticо-linear ; pales 5, triangular above base, tapering into a long awn — Summer — Middle zone of Lebanon to Amanus, Aintâb, and northward.

Var. **squarrosum,** Post. Head 30-40-flowered. Scales of involucre spreading. Pales abruptly narrowed into an awn. (*X. squarrosum. Boiss.*).

2. X. inapertum, Willd. ⊙ .2 to .3. Heads ovate-cylindrical, 30-40-flowered ; scales of involucre *glabrous*, *yellow-vittate*, the outer ovate, abruptly mucronate, the *inner not radiate*, *erect*, *lanceolate ;* pales 5, triangular-lanceolate, a little longer than akene, tapering into a bristle — May and June — Subalpine Lebanon, Aintâb, and northward,

3. X. longepapposum, F. et Mey. ⊙ .2 to .3. Heads *long-cylindrical*, 10-15-*flowered ;* scales of involucre *glabrescent*, the outer small, triangular, the intermediate mucronate, the inner *three times as long*, pink, linear-lanceolate, *erect*, *acute ;* pales 5, lanceolate, villous, *once and a half* as long as akene — May and June — Dry and grassy places ; Gilead, Galilee, Aintâb, and northward.

4. X. cylindraceum, Sibth. ⊙ .1 to .5. Heads oblong-cylindrical, 12-15-flowered ; scales of involucre pale, unarmed, *tomentellous at back*, the outer ovate, obtuse, the inner lanceolate, acutish, *somewhat radiate ;* pales 15, tapering-subulate from a triangular-lanceolate base, *shorter than akene* — May and June — Subalpine Lebanon, Nusairy Mountains, Amanus, Aintâb, and northward.

52. CHARDINIA, Desf. Chardinia.

Heads heterogamous, the outer flowerets few, pistillate, 3-5-toothed, the rest perfect, limb 5-cleft. Scales of involucre imbricated, scarious, ovate, obtuse. Chaff of receptacle clasping the flowerets. Filaments connate into a tube. Anthers with minute, mucronate appendages at base. Akenes of pistillate flowerets glabrous, tapering at base, rigid, surmounted by a pappus of 2-3 pales or bald, 3-winged ; akenes of other flowerets linear-terete, many furrowed, villous below, surmounted by a pappus of 10 pales — Annuals, with aspect of Xeranthemum.

C. xeranthemoides, Desf. ⊙ .1 to .3, appressed-woolly, usually branching. Leaves oblong-elliptical to linear. Branches 1-headed ; heads 8-10-flowered, oblong in flower, obconical in fruit ; scales of involucre glabrescent ; pales of disk-flowerets .012 long — April and May — Deserted fields ; coast, and valleys about Dead Sea to Gilead, Lebanon, Antilebanon, Damascus, Aleppo, Aintâb, and northward.

53. SIEBERA, J. Gay. Siebera.

Heads heterogamous. Marginal-flowerets pistillate, few, short-bilabiate, the rest perfect, 5-toothed. Scales of involucre imbricated, scarious, the inner in fruit rigid, spiny. Chaff of receptacle cleft,

enclosing the flowerets. Filaments free, flattened, glabrous ; anthers with minute appendages. Akenes rather terete, slender, tapering at base, somewhat grooved and soft-hairy ; pales 8-10, lanceolate, tapering-subulate, hirsute above — Annual herbs, differing from Xeranthemum in the spiny, inner scales of the involucre.

S. pungens, Lam. ⊙ .1 to .3, appressed-canescent. Leaves elliptical to linear, with revolute margins, the upper crowded, forming a sort of false involucre around the true one. Heads oblong, 10-20-flowered ; scales of involucre tawny, woolly, spines pink, .02 to .025 long — May to July — Dry hills and clayey fields ; subalpine Lebanon, Cœlesyria, and Antilebanon to Jebel Bil'âs (Syrian Desert), Antioch, Aintâb, Marash, and northward.

Var. **nana,** D.C. Stems very short or 0 — Antilebanon.

54. CARLINA, L. Carlina.

Heads homogamous, many- and equal-flowered, Involucre in several rows, the outer scales leaf-like, the inner scarious, frequently ray-like. Chaff of receptacle many-cleft. Flowerets perfect. Filaments free, appendages of anthers feathery. Akenes terete-obcuneate, silky, with hilum at base. Pappus consisting of 1-2 rows of small pales, parted into 3-4, feathery fibres — Monocarpic or perennial herbs, with spiny, pinnatifid or partite leaves and involucre.

1. C. corymbosa, L. ② .2 to 1, stem simple or corymbose. Leaves cobwebby or glabrescent, coriaceous, lanceolate to oblong-lanceolate, recurved. Heads .03 to .05 broad ; outer scales of involucre spiny-tipped, inner *yellow, glabrous or ciliate* — Summer — Dry fields.

Var. **involucrata,** Boiss. Glabrescent. Upper leaves falling after flowering. Outer scales of involucre linear-lanceolate, with 1-2 spines on either side, twice to twice and a half as long as head — Coast to middle zone of Lebanon.

Var. **Libanotica,** Boiss. Cobwebby-canescent. Outer scales oblong-lanceolate, much longer than inner— Coast to middle zone of Lebanon and Antilebanon, and Damascus, Amanus, and Marash.

2. C. oligocephala, Boiss. et Ky. ② .3 to 1, canescent ; stems corymbose, rarely 1-headed. Lower leaves linear-lanceolate, pinnatiparted into lanceolate, spiny lobes ; stem-leaves lanceolate, folded, spiny-toothed. Heads .03 to .04 broad, the outer leaves of the involucre similar to upper stem-leaves, once and a half as long as rays, the intermediate unarmed except at tip, the inner *straw-colored,* ciliate along their whole length, *woolly at tip* — August and September.

Var. **microcephala,** Boiss. Heads smaller, more condensed. Upper leaves and outer scales rather broader and shorter, little longer than rays — Base of Amanus to Marash, and northward.

3. C. lanata, L. ② .1 to .4, cobwebby, corymbose, the central head nearly sessile, the others peduncled. Leaves folded, oblong to lanceolate, sinuate-pinnatifid or toothed, spiny, those of stem half-clasping. Heads .04 broad, hemispherical ; outer scales of involucre longer than rays, intermediate linear-lanceolate, inner *purple, glabrous* — Summer — Coast and lower mountains.

55. ATRACTYLIS, L. Atractylis.

Heads homogamous, many-flowered. Involucre double, the inner scales in many rows, not rayed. Receptacle chaffy, pales many-cleft. Flowerets perfect, uniform, or the outer radiate, strap-shaped. Filaments free, with bearded appendages. Style with 2, very short, convergent lobes. Akenes terete, silky-hairy, hilum at base. Pappus in 1 row of simple, feathery pales, united at base — Annual or perennial herbs, with aspect of Carlina.

* *Outer flowerets ligulate, radiate.*

1. A. flava, Desf. ♃ *Akeish. Khosherûf.* .1 to .2, *appressed-woolly*, branching from neck, branches ascending or diffuse. Leaves leathery, lanceolate-linear, sinuate-lobed, prickly. Heads terminal, solitary, .02 long, ovate ; leaves of outer involucre *twice as long as head ;* scales of inner involucre woolly, broad-ovate to linear-lanceolate, abruptly prickly-tipped ; flowerets *yellow*, the rays *one-half longer* than the others — May — El-'Arabah to Sinai and Egypt.

Var. **glabrescens,** Boiss. Leaves glabrescent or glabrous ; outer scales of involucre narrower — Arabia Petræa.

2. A. prolifera, Boiss. ⊙ .2 to .6, appressed-cobwebby, canescent, branching from neck ; branches slender, decumbent or ascending. Leaves *lanceolate-linear*, *soft*, prickly-toothed, the upper forming a supplementary involucre *thrice as long as heads.* Heads .03 long, ovate, at forks and terminal ; outer scales of involucre in 1 row, linear-awl-shaped, pectinate-prickly, as long as disk ; inner membranous, cobwebby, the lower ovate, abruptly prickly-tipped, the upper lanceolate-linear, larger, flowerets *purple*, the rays *twice as long as* the others —April — Sands ; northern borders of et-Tîh ; Callirrhoë (Moab).

* * *Flowerets all tubular.*

3. A. cancellata, L. ⊙ .1 to .2, appressed-cobwebby ; stems simple or branching from base, slender, corymbose or monocephalous. Leaves linear, *ciliate-prickly.* Heads ovate, .015 long ; outer scales of involucre in about 1 row, linear, *pectinate-prickly*, a little longer than the oblong to *lanceolate-acuminate*, membranous, inner scales ; flowerets *purple;* pappus once and a half as long as akene — Spring — Hills and fields ; coast and lower mountains, and interior plains ; Jordan Valley.

4. A. serratuloides, Sieb. et Cass. ♄ .2 to .3 or more, woody at base, glabrescent ; branches *white*, *rigid*, *interlaced*, corymbose or few headed. Leaves *leathery*, *rigid*, linear, .02 to .025 long, .002 broad, prickly-toothed. Heads *terminal*, *minute*, *oblong*, .01 to .014 long, .006 broad ; scales of outer involucre leaf-like, linear, pectinate-prickly, longer than the inner, ovate, woolly scales, the latter terminating apruptly in a yellow-spine as long as they ; flowers *pale flesh-color* — Spring — Coast of southern Palestine.

5. A. comosa, Sieb. et Cass. ♃ *Shauk-el-Ghazâl.* 1 or more ; stem *hirsute*, monocephalous or corymbose. Root-leaves *rosetted*, hirsute-bristly, oblong-linear in outline, often .3 to .5 long, pinnatifid into minute, somewhat imbricated, prickly lobes ; stem-leaves few, soon falling, linear, prickly-lobed. Heads solitary, *terminal*, ovate, .05 broad ; leaves of outer involucre longer than head, pinnatipartite into

linear, spiny lobes ; scales of inner involucré in several rows, membranous-margined, ovate to oblong, obtuse ; flowerets *purple* — Summer — Coast to subalpine mountains and interior plains. A very showy plant, the fruiting heads much used for house decoration.

56. LAPPA, Tourn. Burdock.

Heads many-flowered, homogamous. Involucre imbricated, scales awl-shaped, hooked at tip. Receptacle fringed. Filaments free, hairy ; anthers with awl-shaped appendages at base and subulate tip. Akenes oblong, laterally compressed, more or less wrinkled ; hilum at base ; tip of akene somewhat margined. Pappus composed of scabrous, free, short, caducous bristles, in several rows — Unarmed herbs.

L. major, Gærtn. ② 1 or more. Leaves petioled, ovate-cordate, repand-toothed. Heads ovate, .015 long, somewhat corymbed, the hooked scales of the involucre overtopping the flowers ; akenes spotted — July to September — Roadsides and shady places, especially in mountains to subalpine regions.

57. COUSINIA, Cass. Cousinia.

Heads homogamous. Involucre imbricated, scales prickly or spiny at tip. Receptacle bristly, bristles glabrous or barbellate. Flowerets perfect. Filaments free, glabrous ; anthers with ragged appendages at base. Akenes glabrous, obovate-compressed, pyramidal, hilum at base, apex rounded or truncate, often with a 2-5-toothed margin. Bristles of pappus scabrous, free, caducous, short, numerous, rarely wanting — Herbs, commonly perennial, spiny, rarely unarmed.

* *Bristles of receptacle glabrous. Flowerets yellow.*

† *Scales of involucre tapering into an upright, slender prickle.*

1. C. Pestalozzæ, Boiss. ♃ .3 to .5, *glabrous throughout ;* branches zigzag, forked. Leaves leathery, reticulate, those of stem oblong-lanceolate, spiny-lobed. Heads terminal, solitary or 1-3 in a cluster, oblong-cylindrical, .01 long, 4-8-*flowered*, tapering ; scales of involucre about 30 — Summer — Cœlesyria ; Antilebanon ; Ṣaliḥîyeh (Damascus).

2. C. ramosissima, DC. ♃ .4 to .6, bushy ; branches intricate. Leaves leathery, oblong, *cobwebby at lower surface*, glabrescent at upper, sinuate, spiny-toothed. Heads terminal, nearly solitary, *ovate-globular*, .01 to .015 long, 7-12-flowered ; scales of involucre 35-40 — June to September — Lebanon ; Cœlesyria ; Antilebanon ; Damascus.

3. C. foliosa, Boiss. et Bal. ♃ .3, bushy ; branches less intricate than in last. Leaves leathery, oblong, *cobwebby on both surfaces*, or glabrescent at upper, sinuate, spiny-toothed. Heads usually solitary, terminal, ovate-conical, .015 long, 7-12-flowered ; scales of involucre 35-45 — Summer — Akherdagh, and northward. Further study may show that 1 and 3 are varieties of 2.

† † *Scales of involucre tapering abruptly into a hooked prickle.*

4. C. Aleppica, Boiss. ♃ .2 to .3, bushy ; leaves leathery, oblong-lanceolate, pinnately lobed and dentate, prickly, glabrous, green at upper surface, woolly-canescent at lower. Heads *ovate*, .014 long,

15-20-*flowered ;* scales of involucre 50-55, ovate, abruptly acuminate — June — Edlip to Aleppo and Aintâb.

* * *Bristles of receptacle, at least the longer ones scabrous (except C. Wesheni). Flowerets pink or purple.*

† *Scales of involucre cobwebby, broad at base, gradually tapering into a long, recurved, triquetrous spine.*

5. C. Libanotica, DC. ♃ ② .3 to .6, densely appressed-woolly, canescent ; stem thick, corymbose. Root-leaves crowded, lanceolate-linear, pinnatipartite into lanceolate, dentate lobes, tipped with long, yellow spines ; upper leaves half-clasping, ovate-lanceolate, recurved, coarsely serrate-prickly, ending in a long, firm spine. Heads terminal, globular, .02 to .03 in diameter, 60-70-flowered ; spines of involucre .01 to .02 long, flowerets pink ; akenes bald, nearly truncate, obsoletely lobed — July to September — Subalpine and alpine Lebanon.

6. C. Dayi, Post. (Plantæ Postianæ, Fasc. II. 13). ② appressed-tomentellous, canescent ; stem thick, corymbose-paniculate. Leaves oblong, pinnatifid into triangular, spiny-dentate lobes, the upper lanceolate, falcate-recurved, ending in a strong spine. Heads terminal, *ovate*, .015 long, 40-50-flowered ; spines of involucre .01 to .02 long ; flowerets *pink*, akenes bald, truncate — July and August — Northern Antilebanon to alpine summits, and 'Asâl-el-Ward plateau.

7. C. Wesheni, Post. (Plantæ Postianæ, II. 13). ♃ or ② .6 to 1 ; stem thick, winged, flocculent, branching from base, paniculate-corymbose. Leaves woolly at upper surface, pannous at lower, oblong, coarsely spiny-serrate, the lower tapering at base and tip, *the upper long-decurrent at base, forming broad wings to the stem.* Heads numerous, ovate, .012 long, arranged along the upper side of the branches, 30-40-flowered ; involucre densely cobwebby, the outer scales 15-20, linear-lanceolate, spiny, twice to thrice as long as diameter of head, the inner scarious, tawny, much shorter than the *deep purple* flowerets ; bristles of receptacle glabrous, finely fluted ; akenes oblong-club-shaped, margin scarcely lobuled, pappus scabrous — July — El-Jebel-el-Abiad (Syrian Desert), above el-Weshen.

† † *Scales of involucre more or less suddenly contracted into recurved, triquetrous spines.*

8. C. Hermonis, Boiss. ♃ ② *Burlîhah.* .3 to .5, more or less cobwebby-canescent, corymbose. Root-leaves crowded, lanceolate, pinnatipartite into crowded, triangular, 2-3-spiny-lobed and dentate segments ; stem-leaves oblong, very prickly, somewhat recurved, *with long, decurrent wings.* Heads globular, .02 in diameter excluding spines, many-flowered ; spines .018 long, flattened, *deflexed ;* flowerets pink — July and August — Subalpine Hermon, Antilebanon, Cœlesyria, and the eastern slopes of Lebanon.

† † † *Scales of involucre ending in triangular, spiny-tipped appendages.*

9. C. Aintabensis, Boiss. et Haussk. ② .6 or more, appressed-woolly, canescent, corymbose ; stem and branches winged. Leaves leathery, those of root unknown, of stem oblong-lanceolate, wavy-margined, prickly-lobed and toothed. Heads globular, .03 in diameter,

many-flowered ; appendages of involucre .02 to .035 long, .01 broad at base ; inner scales of involucre purple ; flowerets pink — August — Jebel Tullupbaba near Aintâb, and north-eastward.

58. CARDUUS, L. Plumeless Thistle.

Heads homogamous, many- and equal-flowered, flowerets perfect. Scales of involucre imbricated, all except the inner spiny at tip. Receptacle fringed. Tube of corolla short, limb 5-cleft. Filaments free, hairy, anthers bicaudate. Akenes obovate-compressed, glossy, more or less striate and transversely wrinkled, hilum at base, tip with an elevated margin and a central boss. Pappus in many rows, hair-like, rough, united in a ring at base, deciduous — Monocarpic, spiny herbs, with purple flowers.

* *Biennials. Heads flattened-spherical*, .03 *in diameter, with long spines.*

1. C. nutans, L. ② .6 to 1, sparingly cobwebby ; stem with several, incised-dentate, prickly wings. Leaves canescent at lower surface, pinnatipartite into crowded, triangular, prickly- and spiny-dentate lobes. Heads *solitary, nodding*, long peduncled ; scales of involucre ovate at base, ending in a linear-triangular, spiny-tipped, spreading or reflexed appendage, .01 to .015 long, the inner scales scarious, purple at tip — June — Waste places and woods ; Cassius to Akherdagh, and northward.

* * *Annuals. Heads oblong*, .01 *to* .015 *long.*

2. C. pycnocephalus, Jacq. ⊙ .3 to 1 ; stem prickly and prickly-winged. Leaves oblong in outline, pinnatifid into oblong, angular, prickly-toothed lobes. Heads 2-5, *crowded, sessile at the tip of a winged peduncle ;* middle and inner scales of involucre lanceolate, *the inner about as long as flowerets ;* boss of akenes on a short and thick stalk — April to June — Fields and roadsides ; common to subalpine regions.

Var. **Arabicus,** Boiss. Wings narrow ; stems naked above. Plants frequently low ; scales short, oblong-lanceolate, with a short prickle, the inner purple at tip — Arabia Petræa ; subalpine Lebanon ; Damascus ; Aleppo.

3. C. argentatus, L. ⊙ .3 to .5 ; stem and branches slender, wings narrow, sinuate-prickly. Leaves tender, pinnatifid-prickly. Heads *solitary, on long, white, naked peduncles ;* intermediate scales of involucre *lanceolate-subulate*, inner *broad-lanceolate*, acute, *not as long as flowerets ;* boss of akenes on a slender stalk — April to June — Common.

Var. **Esdraelonicus,** Boiss. A coarser plant ; peduncles winged and crisp-prickly, except toward tip ; inner scales as long as flowerets — Plain of Esdraelon ; el-Ḥûleh.

Var. **polycephalus,** Post. Lower branches prickly-winged, ending in 3-4, short-peduncled heads ; upper as in type — Jerusalem.

59. CIRSIUM, Tourn. Thistle.

Heads many- and equal-flowered, flowerets perfect, rarely diœcious. Scales of involucre imbricated, all except the inner spiny-tipped. Receptacle fringed. Corolla equal or gaping, limb 5-cleft or parted. Filaments free, papillose, or glabrous, anthers with 2 appendages or 0.

Akenes ribless, compressed or terete, hilum at base, tip with more or less elevated margin and central boss. Pappus in many rows of feathery bristles united in a ring at base, deciduous, the inner bristles club-shaped, toothed — Monocarpic or perennial herbs with prickly leaves.

* *Leaves strigose at upper surface.*

† *Leaves not decurrent.*

‡ *Heads sessile in a long outer involucre composed of the upper leaves.*

1 C. lappaceum, 2 phyllocephalum, 3 leuconeurum.

‡ ‡ *Heads with a short, outer involucre.*

4 C. Cataonicum, 5 Amani.

† † *Leaves decurrent. Stem winged-prickly.*

6 C. lanceolatum.

* * *Leaves not strigose at upper surface.*

† *Akenes compressed, with membranous epicarps.*

‡ *Scales of involucre entire.*

7 C. Gaillardoti, 8 Siculum, 9 Libanoticum.

‡ ‡ *Scales of involucre ending in a pinnate spine.*

10 C. Acarna.

† † *Akenes ovate-globular, with a straight tip.*

11 C. diacantha, 12 Tauricolum.

† † † *Akenes pyriform, with an oblique tip.*

13 C. Afrum.

† † † † *Akenes linear-oblong, compressed.*

14 C. arvense.

1. C. lappaceum, M.B. ② .3 to .6 ; stem cobwebby, corymbose or racemed. Leaves pinnatipartite into lanceolate, usually bifid lobes, ending in stout, yellow spines. Heads ovate-globular, .02 to .03 long ; scales of involucre cobwebby, ending in a long, *weak, erect or somewhat recurved prickle* — August to October —

Var. **Hermonis,** Boiss. Woolly-canescent — Alpine Lebanon and Hermon.

2. C. phyllocephalum, Boiss. et Bl. ♃ *Shershâr. Khuswân.* 1 or more, slightly cobwebby or hirsute, or glabrescent ; stem corymbose. Leaves bipinnatisect into somewhat retrorse, lanceolate, bifid, spiny-tipped lobes ; stem-leaves auricled-clasping. Heads *ovate*, .015 to .02 long ; involucre *glabrescent*, scales appressed, *mucronate-prickly* — Autumn — Middle and subalpine Lebanon ; el-Kufr (Ḥaurân).

3. C. leuconeurum, Boiss. et Haussk. ♃ .4 to 1, *glabrescent*, except upper surface of leaves, pale green, densely corymbose. Leaves oblong-lanceolate, auricled-clasping, *with prominent, stout, white nerves at lower surface*, pinnatifid into triangular lobes armed at margin and tip with stout, yellow spines. Heads ovate, .02 to .03 long ; scales of involucre tipped with a somewhat spreading, *stoutish* prickle — July to September — Subalpine and alpine Akherdagh, and northward.

4. C. Cataonicum, Boiss. et Haussk. ② 1 or more ; stem white, panicled-corymbose. Leaves white at lower surface, linear-lanceolate, rather remotely pinnatisect, lobes short, ending in long, yellow spines. Heads medium, ovate-oblong ; scales of involucre triquetrous, the inner ending in a short, *weak* prickle — Summer — Akherdagh.

5. C. Amani, Post. (Journ. Linn. Soc., Lond., Bot. xxiv. p. 434). ② .6 to 1 or more ; stem papillose-pubescent, sparingly branched. Leaves leathery, glabrous and strigose at upper surface, minutely cobwebby at lower, oblong, the lower pinnatipartite, the segments bi-tri-fid into oblong, ciliate-prickly lobes, the upper sinuate-lobed, lobes triangular, acute, with sparingly prickly margin. Heads solitary, terminal, ovate, .03 to .04 long, subtended by few bracts shorter than involucre ; involucre glabrous, scales linear, minutely ciliate at margin, ending in *long*, *slender*, *erect*, yellow prickles, *half as long as flowerets* — September — Woods above Hassan Beyley (Amanus).

6. C. lanceolatum, L. ② 1 or more, branching above. Leaves sinuate-pinnatifid or parted, divisions lobed, armed with rather weak spines. Heads ovate, .03 to .05 long, with a few bracts at base ; scales of involucre lanceolate, triquetrous above, tipped with a weak spine — August and September — Middle zone of Amanus, and northward.

Var. **araneosum,** Boiss. Heads densely cobwebby — Ḍûnnîyeh (Lebanon) ; Damascus.

7. C. Gaillardoti, Boiss. ② 1 or more ; stems slender, 1-3-headed, wings narrow, *entire*, *with short prickles*. Leaves lanceolate, *nearly entire*, *minutely toothed*, *armed with weak prickles*. Heads ovate, .015 long ; outer scales of involucre tipped with a short prickle, inner with a scarious, purple tip — Summer — Middle zone of Lebanon and Amanus.

8. C. Siculum, Spreng. ⊙ 1 or more ; stem rigid, branching above ; wings narrow, *lobed*, with *long prickles*. Leaves *sinuate-pinnatifid* into triangular, spiny-tipped lobes. Heads ovate, solitary or clustered ; outer and intermediate scales of involucre *somewhat cobwebby*, tipped with a prickle *as long as they or shorter*, inner ending abruptly in a triangular tip — Summer — Subalpine Lebanon and Cœlesyria.

9. C. Libanoticum, DC. ② *Khuswân.* 1 to 2 or more ; stem panicled, wings lobed, densely beset with long, yellow spines. Leaves pinnatifid into lobed segments, beset with long, yellow prickles. Heads .01 to .015 long, short-peduncled, densely clustered or racemed ; involucre viscid, glabrous, the outer scales tipped with short prickles, the inner ending in scarious appendages — Summer — Middle and subalpine Lebanon, Antilebanon, Cœlesyria, and Damascus, to Marash, and northward.

10. C. Acarna, L. ⊙ .5 to 1, appressed-cobwebby-tomentellous, canescent ; wings nearly entire, ciliate-prickly ; stem corymbose above. Leaves leathery, lanceolate, with *small*, *triangular*, *distant* lobes, tipped with long, yellow spines, *space between lobes ciliate-prickly*. Heads overtopped by the upper leaves which form an outer involucre,

oblong, .03 to .04 long, crowded — July and August — Fields and waste places ; common.

11. C. diacantha, Labill. ♃ 1 or more ; stem canescent, *slender*, with long branches. Leaves sparingly cobwebby or glabrous at upper surface, *snowy-woolly at lower*, linear-lanceolate, half clasping, with *remote*, *small teeth* ending in long, slender, yellow spines. Heads usually in pairs, long-peduncled, ovate, .025 to .03 long ; scales of involucre ending in stiff, triquetrous, spreading to erect spines, often .02 long — Summer — Middle to subalpine zones of Lebanon, Hermon, and Antilebanon, to Amanus, Akherdagh, and northward.

12. C. Tauricolum, Boiss. et Hausk. ♃ 1 or more ; stem white-woolly. Leaves glabrous at upper surface, and snowy-woolly at lower, linear-lanceolate, with small, triangular, bifid lobes, ending in twin spines. Heads large, terminal, long-peduncled, ovate ; scales of involucre ending in broad, lanceolate-triquetrous, spreading to erect spines — Summer — Valley of Nahr-el-Jihân.

13. C. Afrum, Jacq. H. Schoüb. ② 1 or more ; stem white, *thick*, corymbose. Leaves sparingly cobwebby at upper surface, snowy-woolly at lower, the lower linear-lanceolate, pinnatipartite, segments lanceolate, almost reduced to strong, 2-3-parted spines ; stem-leaves oblong-lanceolate, pinnately spiny-lobed. Heads large, *short-peduncled ;* scales of involucre ending in broad-lanceolate, triquetrous, keeled, spreading or erect spines — Summer — Akherdagh.

14. C. arvense, L. ♃ Root-stock creeping ; stems erect, grooved, branching above. Leaves glabrescent or canescent, sinuate-pinnatifid into divergent, dentate, short-prickly lobes, or nearly entire. Heads medium-sized, terminal, solitary or clustered, panicled-corymbose, the middle by abortion diœcious ; scales of involucre appressed, cobwebby at margin, the outer triangular-oblong, ending in a short, somewhat spreading prickle, the inner linear-lanceolate, scarious-tipped — Spring — Mt. Carmel.

60. NOTOBASIS. Cass. Notobasis.

Heads heterogamous ; flowerets all tubular. Involucre imbricated, scales terminating in spines. Receptacle chaffy. Marginal flowerets sterile, central perfect. Filaments hirsute, free, anthers almost without appendages. Akenes obliquely obovate, compressed, smooth, hilum basilar, oblique, chink-like, apex with an obsolete boss. Pappus feathery, in several rows of bristles united in a ring at base — Spiny herbs, with aspect of Cirsium.

N. Syriaca, L. ⊙ .3 to 1 or more ; stem erect, branching above. Leaves glabrous at upper surface, pubescent at lower, oblong, sinuate-lobed, lobes short, spiny-toothed ; floral leaves *with little parenchyma, pinnatipartite into stout, branching, narrow-margined spines.* Heads ovate, .015 to .025 long ; scales of involucre lanceolate, appressed, somewhat spreading at tip — April to June — Fields ; common along coast to subalpine mountains, and interior plains.

61. CHAMÆPEUCE, Griseb. Chamæpeuce.

Heads homogamous, many-flowered, flowerets equal. Scales of involucre imbricated. Receptacle fringed. Corolla ringent. Fila-

ments free, feathery, anthers bicaudate. Akenes obovate, hard, glossy, hilum at base; margin and boss at apex nearly obsolete. Pappus consisting of many rows of feathery bristles united at base in a deciduous ring — Plants, woody at base, with linear-filiform, unarmed leaves.

C. alpini, Jaub. et Sp. ♄ .5 to .8; stems woolly-canescent. Heads 3-9, corymbed, ovate, .02 to .03 long; outer scales of involucre triangular, acute, inner longer, lanceolate, scarious, purplish — March to July —

Var. **camptolepis,** Boiss. Scales of involucre ending in a prickly, recurved tip — March to July — Hanging from face of precipices; coast to middle zone of coast ranges.

62. ONOPORDON, L. Cotton Thistle.

Heads homogamous, many- and equal-flowered. Scales of involucre leathery, entire, spiny-tipped. Receptacle fleshy, honeycombed, cells membranous, sinuate-toothed. Corolla ringent. Filaments free, glabrous, anthers 2-lobed at base, tipped with an awl-shaped appendage. Akenes obovate, 4-angled, somewhat compressed, hilum at base. Pappus caducous, bristles scabrous or feathery, united at base in a ring — Tall, spiny herbs, usually with large heads.

* *Pappus scabrous or plumose. Outer scales of involucre reflexed.*

† *Scales gradually tapering from a broad base into a spine.*

1. O. Illyricum, L. ② 1 or more, densely woolly-canescent, except at upper face of leaves; stem usually branching above, with several, narrow, spiny-toothed wings. Root-leaves broad, lanceolate-oblong, pinnatifid or parted into spiny-toothed lobes; stem-leaves smaller, decurrent. Heads depressed-globular, .05 to .08 broad, truncate-concave at base; scales of involucre purplish, all but the inner spreading or reflexed — Spring — Fields; coast to subalpine regions, and interior plains.

† † *Scales more or less suddenly contracted from a broad base.*

2. O. Sibthorpianum, Boiss. et Held. ② 1 or more, more or less woolly-canescent; stem and branches with very narrow, spiny wings. Root-leaves oblong-lanceolate, pinnatifid or parted into spiny-tipped lobes; stem-leaves smaller, decurrent. Heads globular, .04 to .08 in diameter, truncate or concave at base; spines of involucre-scales much longer than appressed, *oblong* base, the outer spreading or reflexed — May —

Var. **Alexandrinum,** Boiss. Less woolly, cobwebby, greyish. Leaves sometimes pinnately divided — Coast of southern Palestine to lower Egypt.

3. O. ambiguum, Fresen. ② .3 to .6 or more, snowy-woolly; stem with scarcely lobed, prickly wings. Leaves .15 to .05 long, .03 to .01 broad, *scarcely lobed, serrate, armed with numerous, slender, yellow prickles.* Heads medium; scales of involucre *ovate* at appressed base; spines long, awl-shaped — April to June — Waste places; Sinai; Ṣohrat-ed-Dîmâs.

Var. **horridum,** Post. Root-leaves much larger. Spines of stems and leaves much stouter, often .02 long — Ma'în (Moab).

4. O. heteracanthum, C. A. M. ② .6 to 1, woolly-canescent; wings nearly entire, prickly. Leaves lanceolate, pinnatisect into triangular, densely prickly lobes. Heads .1 to .13 broad, *convex at base; outer scales of involucre ending in very short, weak prickles*, intermediate tapering into *long, slender, lanceolate spines*, often .04 long, inner as long as viscid flowerets — April to September — Fields; Moab; Cœlesyria; Aintâb.

Var. **anisacanthum**, Boiss. Spines of outer scales somewhat longer — Cœlesyria; Antilebanon; Haurân.

* * *Pappus feathery. Scales of involucre all appressed.*

5. O. cynarocephalum, Boiss. et Bl. ② 1 to 2, greenish, somewhat cobwebby, minutely glandular-viscid; wings pinnatiparted into strong, lanceolate-spines. Lower leaves oblong-lanceolate, pinnatisect or parted into short, spiny lobes, upper smaller, decurrent. Heads *ovate*, .08 to .1 or more long; scales of involucre glabrous, glossy, the outer oblong-triangular, the inner lanceolate, shorter than flowerets — May to August — Coast to subalpine regions of coast range; interior plains.

63. CYNARA, L. Artichoke. *Ardi-shauki.*

Heads many-flowered, flowerets all perfect. Scales of involucre imbricated, leathery, ending in a spine. Receptacle fleshy, honeycombed, fringed with bristles. Filaments free, terminal appendages of anthers obtuse. Akenes obovate-oblong, somewhat 4-angled, hilum at base, apex scarcely margined. Pappus in many rows, feathery, united in a deciduous ring at base — Spiny, perennial herbs.

C. Syriaca, Boiss. ♃ 1 to 2; stems thick, corymbose, 3-7-headed. Root-leaves .3 to .5 long, pinnatisect into oblong-lanceolate, triangular-lobed, prickly segments; lobes of stem-leaves narrower. Heads ovate-turbinate, .06 long, long-peduncled; involucre contracted, at apex, scales reddish, oblong, ending in spiny-tipped, obcordate, spreading or reflexed appendages, the inner scales scarious; flowerets violet — August and September — Fields and waste places; coast.

C. Scolymus, L., Artichoke, *Ardi-shauki* is largely cultivated for its succulent receptacle and fleshy parts of the scales of the involucre. The leaves of this species are from 1 to 1.3 long.

C. Carduncellus, L., Cardoon, is somewhat cultivated as a vegetable, the parts used being the stalks of the inner leaves, which are rendered white, crisp, and tender by blanching. The flowers have the property of coagulating milk.

64. SILYBUM, Vaill. Milk-Thistle.

Heads many-flowered; flowerets equal, homogamous. Involucre imbricated, the outer scales spiny-tipped, with spinulose-ciliate margins. Receptacle fleshy, fringed with bristles. Filaments papillose, monadelphous; anthers with short appendages. Akenes obovate, laterally compressed, smooth, with hilum at base, and elevated margin at apex. Pappus consisting of several rows of scabrous bristles united at base into a deciduous ring — Spiny herbs with aspect of Carduus.

S. Marianum, L. ② Milk-Thistle. 1 to 2, glabrous, pale green ; stem simple or slightly branching. Leaves large, mottled with white, pinnatifid into ovate-triangular, sinuate-toothed, spiny lobes. Heads globular, .06 to .1 broad, concave at base ; outer scales of involucre oblong at base, broadening into an ovate, prickly-ciliate, margined appendage which tapers abruptly into a long, stiff spine ; inner scales lanceolate, entire — April to June — Waste fields and roadsides ; coast to subalpine regions, and interior plains.

65. TYRIMNUS, Cass. Tyrimnus.

Heads many-flowered, heterogamous, the marginal flowerets neutral. Scales of involucre imbricated, spiny. Receptacle covered with fringed bristles. Corolla obringent, gaping. Filaments monadelphous, hirsute at base; anthers obsoletely caudate. Akenes compressed, glossy, slightly 4-angled, hilum at base, rather oblique, margin and boss at apex elevated. Pappus consisting of several rows of bristles, somewhat scabrous at tip, united into a deciduous ring at base — Annual herbs, distinguished from Carduus by the monadelphous filaments of the stamens.

T. leucographus, L. ⊙ .3 to .5, cobwebby-canescent ; stem erect, slender, winged below, ending in long, wand-like, naked, 1-headed branches. Lower leaves ovate-oblong, upper narrow-lanceolate, decurrent, all short-lobed, prickly-toothed. Heads ovate, .01 to .015 long ; corolla purple — May — Coast, and lower slopes of coast range.

66. STÆHELINA, L. Stæhelina.

Heads homogamous, equal-flowered. Involucre cylindrical, scales imbricated, entire. Receptacle clothed with chaff fringed into bristles. Filaments glabrous, sagittate at base. Akenes striate, hilum near base. Pappus in 1 row, chaffy at base ; pales parted to middle or beyond into five, barbellate bristles — Perennials, with woody base, and rigid stems.

S. apiculata, Labill. ♄ *Kaffat-el-'Ajûz.* .3 to .5 ; stems numerous, wand-like, simple, leafy, ending in a close corymb with few heads. Leaves sessile, lanceolate to linear, .01 to .02 long, .002 broad, mucronate. Heads oblong-cylindrical, .014 long, .004 broad, tapering at base ; scales of involucre mucronate, triangular to oblong ; flowerets pink — August and September — Fissures of rocks ; subalpine Lebanon, Amanus, and northward. A decoction of the plant is used as a remedy for intermittents.

67. JURINEA, Cass. Jurinea.

Heads homogamous, equal-flowered. Scales of involucre imbricated, entire, mucronate or prickly-tipped, the inner longer. Receptacle bristly. Filaments glabrous, sagittate at base. Akenes with a straight or somewhat oblique hilum, obpyramidal, 4-angled or compressed, smooth or wrinkled, apex truncate and more or less clearly margined. Pappus feathery, the inner bristles longer, all united at base into a cylindrical nodule covering the boss of the akene, at length falling with it — Distinguished from Serratula by characteristics of pappus.

1. J. Stæhelinæ, DC. ♂ .2 to .4, canescent, woody at base; stems much branched, branches rigid, interlaced, 1-headed. Leaves sessile, linear, .01 to .025 long, revolute-margined, the lowermost pinnatifid. Heads oblong-cylindrical, .02 to .025 long, .008 broad; scales of involucre oblong-lanceolate, *tipped with slender, tawny awn as long as they* — June to August — Alpine and subalpine Lebanon and Antilebanon; interior plains; Syrian desert.

2. J. ramulosa, Boiss. et Haussk. ♃ .3 to .4, canescent; stems ascending, corymbose-branched, branches leafy, 1-headed. Leaves oblong, .02 to .08 long, .003 to .014 broad, obtuse, mucronate, cordate-clasping. Heads ovate, .04 long; scales of involucre triquetrous, tipped with short prickles — July — Vineyards; Akherdagh.

68. SERRATULA, L. Serratula.

Heads homogamous. Scales of involucre closely imbricated, muticous, the outer shorter. Receptacle bristly. Anthers sagittate at base. Akenes glabrous, terete-compressed, hilum lateral. Pappus long-persistent, bristles scabrous or barbellate, the outer shorter — Perennial herbs.

* *Upper leaves cordate-clasping, oblong. Flowerets yellow.*

1. S. cerinthefolia, S. et Sm. ♃ *Wurreiqah.* .3 to .6, *glabrous;* stems wand-like, forked-corymbose; branches leafy, 1-headed. Lower leaves long-petioled, oblong, obtuse, undivided to lyrate-pinnatisect, stem-leaves oblong to ovate. Heads oblong-cylindrical, .03 long, .008 broad; scales of involucre leathery, acute, the outer short, ovate, the inner elongated, lanceolate — June to August — Dry hillsides; coast to subalpine regions and interior plains.

* * *Upper leaves not auricled, linear. Flowerets pink.*

2. S. oligocephala, DC. ♃ .5, pale green, cobwebby pubescent; stem simple, naked above, racemed or corymbose, 2-7-headed. Lower leaves leathery, petioled, lyrate-pinnatisect. Heads medium, spherical; scales of involucre pubescent, leathery, ovate to oblong, striate at tip, armed with a deciduous mucro, the inner elongated, membranous-acuminate — August — Rocky places; Amanus to Kurd-Dagh, Aintâb, Akherdagh, and north-eastward.

* * * *All the leaves except the floral pinnatipartite. Flowerets yellow.*

3. S. Kurdica, Post. Sp. nov. ♃ 1 or more, cobwebby-pubescent; stem simple, panicled above, few-headed. Leaves firm, .2 to. 3 long, petioled, pinnatipartite into oblong, coarse-serrate lobes .03 to .05 long, rachis winged. Heads long-peduncled, ovate-oblong, .02 to .03 long; scales of involucre pubescent, leathery, ovate to oblong, armed with a yellow, *permanent* mucro, the inner elongated into a *yellow, glossy,* acuminate tip — June — Kurd-Dagh.

69. CRUPINA, Cass. Crupina.

Heads heterogamous, few-flowered. Involucre in few rows, scales scarious. Receptacle bristly. Anthers short-caudate at base. Style 2-lobed. Akenes with hilum at base, and a crenulate cup at apex.

Pappus persistent, the outer in several rows of rigid, barbellate bristles, the inner in 1 row of 5-10, broad, short pales — Annual herbs.

C. crupinastrum, Moris. ⊙ .3 to .6, scabrous; stem erect, dichotomously branched. Lower leaves pinnatiparted into oblong, dentate lobes, upper into linear, denticulate lobes. Heads oblong, .014 long, 9-15-flowered; flowerets purple; inner pappus of 5, oblong pales, denticulate at tip — April to June — Common except in alpine regions.

70. AMBERBOA, Isnard. Amberboa.

Heads heterogamous, marginal flowers rayed. Involucre imbricated. Receptacle bristly. Akenes villous, striate-ribbed, transversely wrinkled, with a tubular pit in the centre of the apex. Hilum lateral, deeply hollowed, with crustaceous margin. Pappus persistent, consisting of several rows of scabrous pales, the inner longer, dilated at tip — Annual herbs, distinguished from Centaurea by the pappus.

1. A. Lippii, L. ⊙ .15 to .25, *papillose;* stems slender, erect or diffuse, stiff. Lower leaves *petioled*, lyrate or pinnatisect into ovate or oblong, dentate lobes; upper leaves sessile, pinnatipartite into linear lobes. Heads *ovate*, .008 long, long-peduncled; involucre villous, scales tapering into a lanceolate, *scarious*, erect tip; *flowerets all pink* — February to May — Sandy places; Arabia Petræa.

2. A. crupinoides, Desf. ⊙ .2 to .4, *villous* or glabrescent; stems slender, forked. Lower leaves *nearly sessile*, pinnatipartite into linear or oblong, usually toothed lobes; upper sessile, pinnatipartite. Heads *ovate-oblong*, .01 long; scales of involucre 3-5-*lined*, acute, *with blackish tip; marginal flowerets blue, disk-flowerets golden* — March and April — Sandy places; deserts about southern Palestine to Sinai and Egypt.

71. ZOEGEA, L. Zoegea.

Heads heterogamous. Involucre imbricated, scales in several rows, membranous, the outer with a pectinate-fringed appendage. Receptacle bristly. Anthers with short appendages at base, filaments glabrous. Akenes 3-furrowed at apex, hilum lateral, deep. Pappus persistent, rigid, of 2 forms, the outer composed of several rows of bristles, the inner of one row of pales or bristles, shorter — Annual herbs, distinguished from Centaurea by the akenes.

1. Z. Leptaurea, L. ⊙ .3 to .6, puberulent-scabrous; stem erect, divaricate; branches slender. Lower leaves pinnatipartite or lyrate, upper oblong to linear, sessile. Heads *ovate*, peduncled, thickened at apex, .03 broad; *ray flowerets orange-colored;* outer pappus composed of white bristles, inner of *black*, *spathulate*, 4-5-toothed pales — May to September — Cœlesyria and Antilebanon to Aleppo, Aintâb, Marash, and eastward.

2. Z. purpurea, Fresen. ⊙ .2 to .3; stem erect, forked; branches slender. Lower leaves narrow-oblong, undivided or pinnatipartite, upper narrow-linear. Heads minute, *globular*, with slender peduncles; ray flowerets *flesh-colored to white; all the bristles of the pappus white*, slender, and *entire* — Spring — Rocks; Arabia Petræa.

72. CENTAUREA, L. Star Thistle. Centaurea. *Shauk-ed-Dardâr.*

Heads heterogamous, the marginal flowerets sterile, rarely homogamous. Involucre imbricated, scales in several rows, leathery or membranous, spiny or unarmed, entire, ragged, or fringed. Receptacle bristly. Anthers caudate at base ; filaments papillose. Akenes generally smooth ; hilum lateral ; pappus persistent (rarely 0), of two forms, the outer consisting of several rows of bristles or pales, the inner of one row of connivent pales — Perennial, biennial, or annual herbs.

I. *Scales of involucre obtuse, or ending in a tender cusp, with a translucent, eroded or fringed, but not ciliate margin. Flowerets rayed. Perennials.*

1 C. pergamacea.

II. *Scales of involucre ending in a pectinate-ciliate, mucronate appendage which is not decurrent. Flowers not radiate. Perennials.*

2 C. Cassia.

III. *Scales of involucre with a scarious, pectinate-fringed, decurrent margin. Flowers blue or violet,* .02 *to* .035 *broad.*

* *Annuals. Akenes bald or pappose.*

3 C. Cyanus, 4 depressa, 5 cyanoides.

* * *Perennials. Akenes pappose.*

6 C. axillaris.

IV. *Scales of involucre white-ciliate, ending in a weak prickle. Heads oblong, less than* .01 *long. Annuals.*

7 C. Ammocyanus, 8 laxa.

V. *Stems and branches rigid. Heads oblong-cylindrical,* .008 *to* .015 *long,* .002 *to* .005 *broad ; scales of involucre with a narrow, membranous, pectinate-fringed margin, more or less decurrent, and ending in a point or short prickle, shorter or somewhat stronger and longer than the lateral fringes. Biennials or perennials.*

9 C. virgata, 10 leptocephala, 11 aggregata, 12 dumulosa 13 Damascena.

VI. *Heads from* .015 *to* .05 *in diameter. Scales of involucre scarious or leathery indurated, fringed above, rarely entire, usually ending in a long, stout, prickly spine. Perennials.*

* *Plants with stems, usually tall. Leaves not decurrent.*

14 C. Antiochia, 15 speciosa, 16 eryngioides, 17 carduiformis, 18 thrinciæfolia, 19 Urvillei.

* * *Plants with tall stems. Stem-leaves more or less decurrent.*

† *Flowerets purple.*

20 C. arifolia, 21 Cataonica, 22 spicata, 23 Haussknechtii, 24 Doddsii, 25 foliosa.

† † *Flowerets yellow.*

26 C. onopordifolia.

* * * *Stemless plants. Flowerets purple.*

27 C. Trachonitica.

VII. *Scales membranous or coriaceous, appressed, densely pectinate-ciliate, ending in a spinescent mucro. Flowers yellow. Pappus subplumose. Annuals.*

28 C. Balsamita, 29 balsamitoides.

VIII. *Scales of involucre with a broad, delicate, translucent margin, entire or denticulate, ending in a slender spine about as long as they.*

30 C. crocodylium, 31 heterocarpa.

IX. *Scales of involucre leathery, not membranous-margined, tipped with a short, prickly appendage or spine. Flowers yellow. Leaves decurrent. Perennials or biennials.*

32 C. Babylonica, 33 myriocephala, 34 Behen.

X. *Scales of involucre ending in a spine, usually long and stout, with pinnate prickles on each side. Upper leaves decurrent or auricled at base. Annuals or perennials.*

35 C. Verutum, 36 solstitialis, 37 Sinaica, 38 Ægyptiaca, 39 Postii.

XI. *Intermediate scales of involucre produced into a long spine with prickles at the base only. Stem-leaves not decurrent, rarely auricled at base. Biennials.*

40 C. procurrens, 41 Calcitrapa, 42 Iberica, 43 pallescens, 44 araneosa.

XII. *Scales of involucre tipped with a palmate-spiny appendage. Perennials.*

45 C. lycopifolia, 46 cheiracantha, 47 hololeuca.

1. C. pergamacea, DC. ♃ .1 to .6, villous-canescent ; stems simple or sparingly branched ; branches 1-headed. Leaves pinnatiparted into oblong to linear-lanceolate, entire lobes ; upper very small, pinnatifid or entire. Heads ovate, .01 to .02 long ; scales of involucre straw-colored, *with inflated, hood-like, obtuse,* muticous appendages ; flowerets pink — April and May — Merj (Damascus) ; el-Jebel-el-Abiaḍ (Palmyrene desert).

2. C. Cassia, Boiss. ♃ .6 to 1, scabrous, green ; stems slender, rigid, sparingly branched above. Leaves pitted, the radical short-petioled, lyrate-pinnatiparted, the upper *oblong-elliptical, entire.* Heads medium, globular ; appendages of scales pale-brown, ovate, rather broader than scales, those of inner scales hooded ; flowerets pink — June — Woods ; Cassius.

3. C. Cyanus, L. ⊙ .2 to .3, sparingly flocculent or cobwebby, branching. Leaves *obovate-lanceolate,* undivided or lyrate, to *linear-lanceolate* and *linear-acuminate, not decurrent.* Heads ovate, .01 to .014 long ; margin of involucre-scales scarious, rust-colored, with white-tipped, triangular teeth, *half* as long as breadth of scale ; intermediate row of pappus somewhat shorter than akene — May — Fields ; Beirût (probably introduced).

4. C. depressa, M.B. ⊙ .4 to .6, cobwebby-canescent ; stems simple or branching from neck. Lower leaves petioled, oblong, entire or lyrate-pinnatifid, the upper linear-lanceolate, mucronate. Heads ovate, .02 to .025 long ; margin of involucre-scales scarious, white or tawny, with white, lanceolate teeth almost as long as breadth of scale ; intermediate row of pappus *rather longer* than akene — June — Fields ; Moab to Gilead, Galilee, Aintâb, and northward.

5. C. cyanoides, Berggr. et Wahl. ⊙ .2 to .4, appressed-cobwebby, canescent ; stems sparingly branched. Root-leaves petioled, ovate, undivided or lyrate ; stem-leaves *elliptical* to lanceolate, *somewhat auricled at base.* Heads ovate, .01 to .014 long ; margin of involucre scales tawny, with white teeth about as long as breadth of scale ; *akenes bald* — April to June — Fields ; common from coast to subalpine regions.

6. C. axillaris, Willd. ♃ .2 to .4 ; root-stock stoloniferous ; stems more or less winged, rising from a rosette of leaves. Leaves more or less *decurrent,* oblong to lanceolate and linear-lanceolate, entire, toothed, or pinnatifid. Heads ovate, .02 to .035 long ; margin of involucre-scales pale or tawny, with white or black teeth longer than margin ; intermediate row of pappus *one-third to one-fourth* as long as akenes — Summer — Aintâb, and northward.

Var. **cana,** Boiss. White-woolly. Leaves entire or nearly so, commonly narrow. Heads .015 to .02 long — Alpine Lebanon and Antilebanon.

7. C. Ammocyanus, Boiss. ⊙ .15 to .3, branching from neck, the central branch frequently reduced to a sessile head, the lateral prostrate. Root-leaves obovate, .035 long, pinnatifid to lyrate or toothed ; stem-leaves linear, few-lobed, the upper entire. Scales of involucre glabrous, green, prickle straight, scarcely longer and stronger than the teeth ; flowerets *pink* — April and May — Sandy places ; northern borders of et-Tîh ; el-Balqâ.

8. C. laxa, Boiss. et Haussk. ⊙ .2 to .3 ; stem erect; with *forked, spreading branches.* Lower leaves lanceolate-oblong, .035 long, long-petioled, somewhat toothed ; stem-leaves sessile, pinnatipartite, the upper linear, entire. Scales of involucre glabrous, pale green, prickle at length recurved, about as long as scale ; flowerets *purple* — Spring — Damascus to Qaldûn (Antilebanon), Palmyrene desert, and eastward.

9. C. virgata, Lam. ♃ .5 to .7, appressed-pubescent. Root-leaves petioled, 1-2-pinnatipartite into *linear* lobes ; stem-leaves *sessile,* few-lobed or entire, the uppermost scale-like, minute. Heads peduncled, solitary, or clustered, oblong, .008 to .01 long, .003 to .004 broad ; *prickle of involucre-scales scarcely longer or stouter than fringe, often shorter ;* flowerets *pink* — May and June — Antilebanon to Aintâb, and northward.

Var. **squarrosa,** Boiss. Terminal prickle stouter than fringe, *sometimes twice as long,* spreading or recurved — Cœlesyria and Antilebanon.

C. diffusa, Lam., said by Tristram to be found in the Buqa', is probably the above.

10. C. leptocephala, Boiss. ② .5 to .7. Leaves rigid, the lower pinnatipartite into linear lobes, the upper *linear, toothed and entire.* Heads solitary, linear-cylindrical, .01 long, .002 broad; flowerets *purple* — May and June — Cœlesyria and Antilebanon. Probably a variety of the last.

11. C. aggregata, F. et M. ② .5 to .8. Root-leaves lyrate, the terminal segment *ovate-rhombic*, the *lateral oblong*, often intermixed with minute lobules; stem-leaves sessile, *oblong*, sparingly lobed or entire. Heads 2-7 *in a cluster* at the ends of the branches; *mucro of involucre-scales shorter than fringe*, stout; flowerets *purple* — June and July — Rocky places; Marash, and northward.

Var. **microcephala,** Post. Heads .008 long, .003 broad, solitary or 2-3 in a cluster — El-Jebel-el-Aḥmar (Amanus); Aintâb.

12. C. dumulosa, Boiss. ♄ .2 to .4; branches 4-angled. Leaves few, *pinnatipartite into awl-shaped lobes, or entire, awl-shaped;* upper leaves scale-like. Heads *solitary*, oblong, .01 long, .005 broad; prickle of involucre scales longer than white fringe; flowerets pink — May to July — Dry places; Merj-Ayûn to Cœlesyria, Antilebanon, and Palmyrene desert.

13. C. Damascena, Boiss. ♄ .3 to .6, sparingly leafy, 4-angled. *Root-leaves linear, with a few, short, toothed lobes;* stem-leaves scale-like, entire. Heads .015 long, .005 broad; scales of involucre with *a broad, scarious, translucent, entire or ragged-fringed margin, ending in a weak, slender prickle, as long as scale or shorter;* flowerets *pale pink* — June and July — Dry hillsides; Antilebanon to Damascus.

14. C. Antiochia, Boiss. ♃ 1 to 1.4, sparingly cobwebby, glabrescent, corymbose above. Leaves short-petioled, lyrate-pinnatipartite into obtusely-toothed lobes, stem-leaves small, the upper scale-like. Heads .02 broad, peduncled; spines of intermediate scales of involucre .015 long, longer than scale; flowerets *dark purple; akenes densely hirsute* — June — Chalky rocks about Antioch.

15. C. speciosa, Boiss. ♃ .25 to .35, appressed-canescent, *woody at base.* Leaves *tender*, crowded, pinnatipartite into oblong, obtuse, pinnate-lobed segments. Scales of involucre *not fringed;* spines prickly near base, twice to thrice as long as scale, .01 to .015 long; flowerets *pink* — May and June — Vertical rocks; upper Galilee to subalpine zone of Lebanon and Hermon.

16. C. eryngioides, Lam. ♃ .3 to .5, crisp-puberulent, green, *coarse-pubescent at neck;* stems rigid, thickish, usually branching from base. Leaves lyrate-pinnatipartite into small, obtuse lobes, the terminal lobe ovate-oblong. Heads globular, .02 in diameter, with long, stout, nearly naked peduncles; scales of involucre glabrescent, pale, broad-ovate, margin pectinate-fringed with white prickles, terminal spine stout, .01 to .035 long; flowerets *pink* — April and July — Rocky places; Sinai to subalpine Lebanon, Cœlesyria, Antilebanon, Damascus, Palmyra, and northward.

Var. **brachyacantha,** Boiss. Spines more slender, not as long as flowerets, but twice as long as scales — Palestine; subalpine Lebanon and Antilebanon; Palmyra.

Var. **Ainetensis,** Boiss. Grey-hirsute with ringed hairs — Between 'Ain-Ata and Deir-el-Ahmar.

17. C. carduiformis, DC. ♃ 1 or more, greyish with papillose, spreading or appressed flexuous hairs ; stems rigid, 1-headed, or sparingly branched. Leaves pinnatipartite into *oblanceolate-linear to oblong*, sparingly dentate leaflets, *intermixed with minute lobules.* Heads globular, .03 broad ; scales of involucre broad-ovate, margin thickly beset with *long*, pectinate prickles ; spines yellow or tawny, spreading or reflexed, as long as scale or twice as long ; flowerets *purple to pink* — June — Chalky hills between Kessab and Antioch.

18. C. thrinciæfolia, DC. ♃ 1 or more, hirsute below ; stem angular-striate, sparingly branched. Leaves pinnatipartite into *linear* leaflets. Heads globular ; scales ovate, margin beset with *short*, pectinate prickles ; terminal spine slender, *about as long as scale* or a little longer ; flowerets *pink* — Spring — Palmyra, and north-eastward.

19. C. Urvillei, DC. ♃ .06 to .15, appressed-cobwebby, canescent, *almost stemless.* Leaves nearly all radical, *rosetted*, lanceolate-linear in outline, lyrate, *forming an involucre for the head*, segments more or less dentate or pinnatifid, interspersed with lobules. Heads nearly sessile or on peduncles not more than .1 long, globular, .03 to .05 broad ; scales ovate, margin pectinate-prickly ; spines of intermediate scales lanceolate at prickly base, stout, .015 long, *as long as pink* flowerets — May and June — Aintâb, Marash, and northward.

Var. **caulescens,** Post. .3. Root-leaves shorter than stems, with one pair of oblong, entire lobes, .03 long, and a terminal lobe much larger, rhombic-ovate, .07 long ; stem-leaves entire, oblong ; tapering to a petiole ; upper leaves linear-oblong, minute, bract-like. Heads on rather long, nearly naked peduncles — Aintâb.

20. C. arifolia, Boiss. ♃ .6 to 1 or more, green, somewhat crisp-puberulent ; stem slender, 2-4-headed. Leaves *nearly entire*, the lower long-petioled, *ovate-cordate or slightly ha berd-shaped*, obtuse, often .4 long, including petiole, the upper elliptical to oblong-lanceolate, tapering at base. Heads globular, .02 to .025 broad ; scales of involucre glabrous, the lower orbicular, prickly-mucronate, the intermediate ending in a triangular, pectinate appendage, tapering into a short, dark-brown spine as long as the appendage ; flowerets *deep-purple* — June — Cassius and el-Jebel-el-Ahmar (Amanus) ; Antioch plain.

21. C. Cataonica, Boiss. et Haussk. ② .5 to 1 ; stem glabrescent, 4-7-*headed.* Leaves firm, with elevated, netted veins, rough-papillose, the lower *short-petioled*, *lyrate-pinnatipartite* into 1-2 pairs of oblong segments ; stem-leaves small, *oblong-lanceolate*, acute, entire. Heads globular, .03 to .04 broad ; scales of involucre leathery, appendages triangular, pectinate-prickly, the inner tapering into a stout spine as long as appendage — July to September — Plain of Marash.

22. C. spicata, Boiss. ② .6 to 1, rough-papillose, green ; stem winged, 4-9-headed. Leaves firm, the lower lyrate, lateral segments 1-2 on each side, oblong, terminal segment large, oblong, cuneate or cordate at base, intermediate leaves oblong-lanceolate, tapering at base, upper linear. Heads ovate, .02 broad ; scales of involucre glabrous,

inner appendages leathery, triangular, erect-spreading, tapering into a broad, stout spine, longer than appendage — June — Fields ; Lattakia to Amanus, and northward.

23. C. Haussknechtii, Boiss. ♃ .6, appressed-cobwebby, canescent, and rough papillose ; stem slender, *nearly naked above*, 3-6-headed. Lower leaves petioled, lyrate, with 1-2, retrorse segments on each side, the terminal ovate-triangular, cuneate or cordate at base ; upper leaves small, linear-lanceolate, *scarcely decurrent.* Heads peduncled, ovate, .03 broad ; appendages of scales leathery, triangular, pectinate-fringed, tapering into stout spines, those of intermediate scales .01 long — July — Ṣofdạgh (Amanus).

24. C. Doddsii, Post. (Trans. Linn. Soc. Lond. Vol. xxiv., Bot. p. 434). ♃ .6 to 1.5, green, sparingly cobwebby ; stems simple, leafy, 8-14-headed. Leaves firm, minutely and sparingly papillose, the lower long-petioled, *cordate-ovate, entire or somewhat repand ;* the middle ones *oblong-lanceolate*, acute, *tapering into a winged petiole*, the upper sessile, linear, somewhat decurrent. Heads ovate, sessile, .02 to .03 broad ; appendages of scales of involucre leathery, straw-colored, ovate, pectinate-ciliate, ending in recurved stoutish spines, the intermediate .01 to .015 long — June and July — Plain of Antioch at base of el-Jebel-el-Aḥmar.

25. C. foliosa, Boiss. et Ky. ② 1 or more, glabrescent, green; stem leafy along its whole length, thyrsoid-racemed above. Root-leaves long-petioled, *lamina .3 to .5 long*, lyrate-pinnatipartite into 1-2 pairs of lanceolate, obtuse, retrorse lobes with rounded sinuses, *the terminal lobe .25 long*, nearly cordate, repand ; stem-leaves oblong, entire, *long-decurrent.* Thyrsus .3 long, with 2-3 heads in each cluster ; heads ovate, .02 to .03 long, *bracted by lanceolale leaves ;* appendages of scales leathery, yellow, *velvety*, *reflexed*, pectinate-prickly, .01 to .02 long, including slender, terminal spine — June and July — Near 'Arsûṣ (Amanus).

26. C. onopordifolia, Boiss. ♃ .6 to 1, appressed-woolly, canescent ; stems *several*, *prickly-winged*, *leafy*, somewhat panicled above. Leaves leathery, *lanceolate-linear*, with elevated nerves at lower surface, pinnatifid, *lobes prickly-toothed*, *ending in a short*, *strong spine*, the upper leaves prickly-dentate, decurrent. Heads nearly sessile, ovate, .025 long ; appendages of involucre scales glabrous, leathery, yellow, the lower small with 5-7 palmate prickles, the intermediate prickly at base, ending in a spine .025 to .03 long, the inner with a scarious, hooded, unarmed tip — July — Fields ; Cœlesyria.

27. C. Trachonitica, (Post. Journ. Linn. Soc. Lond, Vol. xxiv., Bot. p. 434). ♃ Nearly or quite stemless, *strigose. All the leaves radical*, or rosetted at the base of short peduncles, lyrate-pinnatisect into unequal, oblong to oblong-lanceolate, obtuse or acute, mucronate, more or less irregularly dentate, decurrent segments. Heads 8-15, nearly sessile, ovate, .03 to .04 long ; scales of involucre glabrous, ovate, reddish-green, ciliate toward tip, the outer with a short spine, the intermediate with a *stout*, spreading or reflexed, reddish spine, .02 long, the inner unarmed, with a red, scarious, denticulate tip ; flowerets *purple* — May — Volcanic scoriæ near Shuḥbah (el-Leja).

Distinguished from C. Hellenica, Boiss. et Sprun. by its numerous (8-15 not 1-4) heads, the stout spines of the involucre, the strigose indument, the orange-colored base of the pappus, the intermediate series of which is longer than, and the inner as long as, the akene.

28. C. Balsamita, Lam. ⊙ .2 to .8, scabrous, pale-green; stem erect, simple or stiff-branched, branches 1-headed. Leaves pitted, oblong, obtuse, entire or dentate, to linear, entire *with a setaceous tip*, the uppermost subulate-setaceous. Heads ovate, .02 long; scales of involucre *yellow*, *triangular-lanceolate*, prickle twice as long as ciliæ, *some of the inner scales red-tipped* — July — Fields; eastern plateaux of Antilebanon to Aintâb, and north-eastward.

29. C. balsamitoides, Post. (Plantæ Postianæ II. p. 15). ⊙ 1 or more, glabrous, glaucous; stem erect, panicled; branches rigid. Leaves **. Heads ovate-conical, .01 to .015 long, .006 broad; scales of involucre *pale-green, lanceolate, acuminate, ;* prickle twice to *thrice* as long as ciliæ, the innermost scales herbaceous, entire; pappus *scarcely plumose*—July—Plain between ed-Derajât and Marbaṭ-'Antar (Palmyra).

30. C. Crocodylium, L. ⊙ .6 to 1.3, green, sparingly papillose; stem *slender;* branches *long*, *naked*, 1-*headed*. Lower leaves petioled, undivided or lyrate, upper sessile, pinnatipartite into linear lobes. Heads *hemispherical*, .015 in diameter; flowerets *pink*, the marginal neutral, radiating; *akenes hispid* — May — Galilee to Banias, Merj-'Ayûn, and Beirût.

Var. **crocodylioides,** Boiss. Membrane of the scales parted on each side to the base into 5-7, white fringes — Plain of Esdraelon.

31. C. heterocarpa, Boiss. et Gaill. ⊙ .5 papillose-pubescent; *stem thick, with short, forked branches from base.* Leaves somewhat petioled, pinnatipartite. Heads ovate-conical; flowerets *pale flesh-colored;* akenes *villous, very dissimilar*, those of margin minute, crowned with short chaff, those of disk larger, *black;* pappus once and a half as long as akenes — May — Judeidah (Merj-'Ayûn) and Antilebanon.

32. C. Babylonica, L. ② 2 to 3.5, appressed-cobwebby, canescent; stem thick, leafy, winged, *ending in a long, many-headed, thyrsoid panicle.* Lower leaves large, oblong, short-petioled, pinnately lobed or parted; stem-leaves smaller, the upper linear-lanceolate, acuminate. Heads nearly sessile, crowded along the short branches, conical with a rounded base, .02 long; scales of involucre tipped with a very short prickle — July to September — Dry hillsides; coast and mountains to 1,000 m. and interior plains.

33. C. myriocephala, Sch. ② ♃ .3 to .5, rough-papillose, *with forked, spreading branches from base, many-headed.* Lower leaves lyrate, upper pinnatipartite to oblong-lanceolate and linear, entire. Heads terminal, oblong-conical, .008 to .01 long, on peduncles bearing a few, small leaves; scales of involucre tapering into a yellow, erect spine, the intermediate as long as scales — May to July — Gilead to Ḥaurân, Damascus, Palmyrene desert, Aleppo, Aintâb, and eastward.

Var. **major,** Boiss. Heads as large as a filbert — Between Ḥems and Ḥama.

34. C. Behen, L. ② ♃ *Behmen.* 1 to 1.5, sparingly papillose-pubescent ; *stems interruptedly winged with decurrent leaves, corymbose.* Leaves firm, with elevated nerves and veins, those of root large, petioled, oblong, entire or pinnatifid to lyrate ; stem-leaves oblong, entire, pinnately lobed, decurrent at base ; those of branches minute, elliptical-linear. Heads ovate-conical, .02 to .03 long ; scales of involucre acute, with a very short, prickly mucro — May to July — Dry places ; middle to subalpine mountain zone ; Sha'rah, between Ḥems and Tripoli.

Var. **subbracteata,** Boiss. Leaves of peduncles sometimes as long as heads, but always linear — Coast ; Lebanon ; Aintâb.

Var. **brachyptera,** Boiss. Wings of upper leaves short ; heads smaller — Merj-'Ayûn ; Antilebanon.

35. C. Verutum, L. ⊙ .6 to 1.3 ; stem leafy, simple or stiff-branched, branches with narrow, entire wings. Lower leaves *oblong, sinuate-pinnatifid to lyrate,* the rest or all *linear-lanceolate, entire.* Heads *terminal, solitary, globular,* .02 in diameter, *concave-truncate at base ;* lateral prickles of involucre-spines minute, 1-2 on each side toward middle of spine ; flowerets *yellow* — June — Borders of fields ; coast and lower mountain zones, and interior plains.

36. C. solstitialis, L, ⊙ .3 to 1, appressed-cobwebby, canescent ; stem and branches rigid, winged, the latter spreading. Lower leaves lyrate, stem-leaves linear, entire, decurrent into entire wings *as long as internodes.* Heads terminal, solitary, ovate, .01 to .015 long ; lower scales of involucre terminating in 3, short prickles, the intermediate in a slender, sharp spine as long as the head or twice as long, with 2 prickles on each side at base ; flowerets *yellow* — April to June — Common from coast to subalpine regions.

37. C. Sinaica, DC. ⊙ .2 to .3. cobwebby, branching from neck, dichotomous, proliferous ; wings narrow, *shorter than internode.* Leaves linear, *with remote, irregular, oblong lobes,* or dentate, or entire. Heads in forks or terminal, short-peduncled, solitary, ovate, .01 to .015 long, somewhat bracted by upper leaves ; spines of of involucre with 2-3, rather remote prickles on each side ; flowers *flesh-colored* — April — Hills and valleys about the Dead Sea to Sinai.

38. C. Ægyptiaca, L. *Yamrûr. Yamrâr.* ② .15 to .2, densely crisp-papillose, canescent, branching from base ; branches leafy, forked, proliferous, 1-3-headed. Leaves linear-oblong, pinnatipartite or cut into oblong to linear, toothed or lobed segments, the upper nearly entire, *minutely auricled at base.* Heads ovate-oblong, .015 long, *with thickish, short peduncles, bracted by the upper leaves;* spines of involucre curved, 4-5 times as long as the scales, with two prickles on either side of the lower half ; flowerets *pale-purple* — April and May — Arabia Petræa to Egypt, and southward.

39. C. Postii, Boiss. ♃ .3 to .6, tomentose-canescent ; stems *prostrate,* densely leafy, forked. Leaves oblong in outline, pinnatipartite into *small, oblong, prickly-pointed lobes.* Heads ovate, .01 long, at forks and terminal, *sessile or short-peduncled,* bracted by the upper leaves ; spines of involucre broad at base, spreading, the lower as long as scales, the upper twice to thrice as long, *all with short prickles at*

base or 0 ; flowerets *pink* — June and July — Cœlesyria ; Damascus; Yebrûd ; Qaryetein.

40. C. procurrens, Sieb. ⊙ .15 to .25, crisp-papillose, canescent, proliferous from neck, with a central head nearly sessile ; *branches procumbent*, 1-3-headed. Leaves linear, the radical pinnatifid into short, toothed lobes ; upper leaves toothed. Heads ovate, .01 to .015 long, bracted by the upper leaves ; scales of involucre ovate, narrowly white-margined, appendage spreading-reflexed, with 5-7, palmate prickles, the lower about as long as the scales, the central spine of intermediate scales stout, twice to thrice as long as scale ; flowerets *flesh-colored* — Spring — Sands ; Jaffa to Gaza.

41. C. Calcitrapa, L. ② .4 to .6, papillose ; stem erect, forked, branching from base. Root-leaves pinnatipartite into linear, dentate lobes ; stem-leaves sessile, lobes few, the uppermost leaves undivided. Heads lateral and terminal, solitary, ovate, .01 long ; prickles of involucre 5-7 at each side of terminal spine, short ; flowerets *purple ; akenes bald* — May and June —Roadsides and waste places ; coast to lower and middle mountain zones, and interior plains.

42. C. Iberica, Trevir. ② .4 to .6 or more, papillose ; stem erect, forked, branching. Root-leaves lyrate-pinnatifid or parted ; stem-leaves sessile, short, few-lobed, the upper undivided. Heads solitary, ovate, .015 long ; prickles of involucre 1-3 at base of terminal spine ; flowerets *pink ;* akenes frequently *lined and spotted, pappus shorter than akene* — June and July — Common except in alpine regions and deserts.

Var. **Meryonis,** Boiss. Root-leaves sometimes undivided ; stem-leaves less divided, sometimes entire. Scales of involucre *white-margined ;* spine stouter — Coast ; Lebanon ; Antilebanon.

Var. **Hermonis,** Boiss. Leaves more dissected. Heads frequently smaller, and spines longer but more slender ; flowerets *pale* — Lebanon ; Hermon.

43. C. pallescens, Del. ② .4 to .6, pruinose, diffusely forked. Root-leaves rosetted, pinnatipartite or lyrate ; upper leaves sessile, oblong to linear, *toothed.* Heads ovate, .01 long ; terminal spines of involucre white, terete, or flat above, with 2-3 prickles on each side at base ; flowerets *pale-yellow; pappus as long as akene* —Spring — Common, except in alpine regions and deserts.

Var. **hyalolepis,** Boiss. Scales with a broader, translucent margin ; *prickle at base of spine very short, sometimes* 0 — Common.

44. C. araneosa, Boiss. ② .3 to .5, densely crisp-papillose ; stem branched, dichotomous. Lower leaves pinnatipartite or cut, upper sessile, auricled, lanceolate, toothed. Heads ovate, .01 long, bracted by the upper leaves ; involucre *cobwebby ;* spines of intermediate scales stout, with 3-4 prickles at either side of base ; flowerets *deep yellow ; pappus about as long as akene* — Spring and summer — Coast ; common, especially in sandy places.

45. C. lycopifolia, Boiss. et Ky. ♃ .3 to .6, sparingly hairy, green ; stem erect or ascending, brittle, simple or sparingly branched. Lower and intermediate leaves petioled, lyrate, upper *ovate to oblong, sessile, tapering at base.* Heads rather large, solitary, bracted by the

small upper leaves ; involucre *cobwebby ;* prickles 7-9 ; flowerets *golden-yellow* — June — Coast near Alexandretta to Beilân, and northward.

46. C. cheiracantha, Fenzl. ♃ .3 to .6 ; stems slender, *cobwebby*, leafy, angled, simple or with few branches, 1-3-headed. Leaves canescent at lower surface, the lower long-petioled, oblong-lanceolate, undivided or lyrate, the upper oblong-lanceolate to linear, slightly decurrent. Heads solitary, with 1-2 leaves at base, *ovate*, .01 to .015 long ; involucre *glabrescent ;* flowerets yellow, *pappus much shorter than akenes* — Summer — Middle to subalpine and alpine Lebanon, Antilebanon, Cassius, Amanus, and northward.

47. C. hololeuca, Boiss. ♃ .3, appressed-canescent ; stem leafy, simple, 1-headed. Leaves oblong-lanceolate, undivided except the lowest, which have sometimes 1-2 lobes at base; lower leaves tapering into a petiole, upper smaller, sessile, short-decurrent. Heads *ovate-conical, truncate* at base ; prickles of involucre very short ; flowerets yellow ; *pappus as long as akene or longer* — August — Subalpine Lebanon and Hermon.

73. CNICUS, Gærtn. BLESSED THISTLE.

Heads heterogamous, the outer flowerets sterile. Scales of involucre in few rows, ending in a pinnate spine. Receptacle clothed with long bristles. Anthers short-caudate at base, filaments papillose, free. Akenes with prominent ribs, crowned with an elevated, toothed margin, hilum lateral. Pappus of two forms, the outer of 10 beards, the inner of 10 short bristles — Annual herbs.

C. benedictus, L. ⊙ .1 to .3, with spreading branches. Leaves pale, sinuate-pinnatifid or parted ; floral-leaves ovate-oblong, forming an involucre to the ovate, .03 long heads, and longer than they ; flowerets yellow — March to May — Plain of Gaza ; Aleppo ; Aintâb.

74. RHAPONTICUM, DC. RHAPONTICUM.

Heads homogamous, many- and equal-flowered. Scales of involucre imbricated in several rows, with scarious appendages. Receptacle bristly. Style 2-lobed. Akenes somewhat 4-angled, all pappose, hilum lateral. Pappus composed of barbellate or feathery, long bristles in several rows, rows gradually lengthened from outer to inner — Perennial herbs, with large heads.

R. pusillum, Labill. ♃ .05 to .1, stemless, 1-3-headed. Heads ovate, .04 long, .03 broad, subtended by a rosette of radical, 2-pinnatipartite leaves ; scales of involucre leathery, tipped with a short, triangular, acuminate spine — April to June — Fields, and hillsides ; common.

75. PHÆOPAPPUS, Boiss. PHÆOPAPPUS.

Heads heterogamous, marginal flowerets neutral. Scales of involucre leathery, in several rows, spiny or prickly. Receptacle bristly. Filaments free, papillose, anthers with very short appendages at base. Style with 2, short lobes at apex. Akenes all pappose, hilum lateral, pappus persistent, uniform, feathery or barbellate, in several indistinct

rows, gradually increasing in length from the outer to the inner — Herbs, with habit of Centaurea, flowerets (in ours) yellow.

* *Pappus plumose. Heads .02 to .03 long.*

1. Ph. Libanoticus, Boiss. ♃ .05 to .3 ; stems 1-2-headed. Leaves *linear, sinuate-pinnatilobed.* Heads oblong-conical, .02 long, .01 broad ; scales of involucre with 3-4 pairs of prickly bristles shorter than the scales — Summer — Subalpine and alpine Lebanon and Hermon.

2. Ph. Kotschyi, Boiss. ♃ .2 to .5 ; stems erect or ascending, simple or branching. Leaves *oblanceolate to lanceolate, entire.* Heads ovate-conical, .03 long, .01 broad ; scales of involucre with 2-4 pairs of prickles, terminal spine shorter than scale, weak — Summer —

Var. **Persicus,** Boiss. Prickles and spines fewer and weaker — Akherdagh.

Var. **floccosus,** Boiss. Woolly-canescent ; stems decumbent ; leaves narrower ; terminal spine of scales shorter, more slender, and beset at base by prickles or bristles — Between Marash and Aintâb.

3. Ph. longispinus, Post. (Plantæ Postianæ II, 14) ♃ .2 to .6, sparingly cobwebby, scabrous, pale green ; stems erect, simple or sparingly branched. Leaves lanceolate-linear, the lowest tapering to a petiole, *pinnatisect into few, oblong lobes,* the upper sessile, *obsoletely repand-dentate* or entire. Heads ovate-conical, .03 long, .015 broad ; appendage of scales spreading or reflexed, *the terminal spine .02 to .03 long,* much longer than the 1-2 pairs of lateral prickles ; pappus white, nearly twice as long as the .008 long akene — July — Fields and gravelly places ; eastern wadis of northern Antilebanon ; 'Asal-el-Ward plateau.

* * *Pappus barbellate or scabrous.*

† *Heads as large as a walnut, solitary, nodding.*

4. Ph. Aintabicus, Post. (Plantæ Postianæ III.) ♃, sparingly papillose, scabridulous. Upper leaves *oblong, acute, serrate, the uppermost transformed into fimbriated bracts.* Peduncles short, thickened, nodding ; appendages of involucre scales ovate, reflexed, *pectinate-prickly at margin,* terminal prickle longer and stronger than the lateral, *the margin of the upper scales ragged-dentate,* pappus as long as akene — June — Aintab. Described from specimens destitute of lower leaves. A species near Ph. Armenus, J. et Sp., distinguished by undivided leaves, and pectinate-prickly instead of palmate-prickly margin.

† † *Heads smaller than a hazel-nut.*

5. P. scoparius, Sieb. ♄ *Birkân. Woody at base ;* stems forked ; branches interlocked, 1-headed. Lower leaves *pinnatilobed,* intermediate undivided, upper small, scale-like. Heads oblong, peduncled ; scales of involucre yellow, tipped with a spreading spine longer than the scale, with two prickles at base ; pappus white, about *twice* as long as akene — Sinai to upper Egypt.

76. PTOSIMOPAPPUS, Boiss. Ptosimopappus.

Heads heterogamous. Scales leathery, imbricated in many rows, mucronate at tip. Akenes smooth, compressed, hilum lateral, excavat-

ed, usually produced into two, divergent furrows. Pappus caducous, nearly all in 1 row of rough bristles — Evergreen herbs, woody at base.

P. bracteatus, Boiss. ♄ 1 to 2 ; stems thick, terete, indurated, naked, corymbose. Leaves of sterile branches oblong-spathulate, .15 long, .03 broad, entire, petioled, of fertile branches oblong-linear, .02 to .03 long, .003 to .005 broad. Heads ovate-conical, .015 long — June to September — Open glades ; Cassius and Amanus.

77. CARTHAMUS, L. Carthamus. Safflower. *Qurtum.*

Heads homogamous, many- and equal-flowered. Involucre in several rows, the outer scales leaf-like, spiny, the inner scarious. Receptacle densely fringed with long bristles. Filaments free ; anthers not caudate at base. Akenes club-shaped or obovate, obtusely 4-angled, bald or pappose ; hilum lateral. Pales or bristles of pappus in several rows, scabridulous — Herbs, with spiny-toothed and -lobed leaves

* *Pappus chaffy.*

† *Inner row of pappus shorter than outer.*

‡ *Inner scales of involucre entire.*

1. C. lanatus, L. ② ⊙ .5 to 1, *more or less cobwebby ;* stem erect, corymbose. Root-leaves lyrate, stem-leaves leathery, lanceolate, *pinnatifid or parted.* Heads *ovate*, .02 to .03 long ; flowerets *yellow ;* akenes thick, top-shaped — June to October — Waste places ; common.

2. C. glaucus, M.B. ⊙ *Qûs.* .5 to 1, *puberulent, canescent ;* stem erect, corymbose. Lower leaves lyrate-pinnatifid, stem-leaves oblong-lanceolate to linear-lanceolate, spiny-toothed. Heads *oblong-ovate*, .02 long ; flowerets *purple ;* akenes short-ovate — Summer —

Var. **Syriacus,** Boiss. Crisp-woolly to glabrescent. Pales usually white, the intermediate very acute — Waste places and fields ; common along coast, and lower and middle mountain zones.

Var. **tenuis,** Boiss. Glabrescent. Leaves narrower ; heads smaller ; pappus becoming black ; intermediate pales sometimes obtuse — Coast.

‡ ‡ *Inner scales of involucre pectinate-ciliate toward tip.*

3. C. nitidus, Boiss. ⊙ Glabrous ; stem erect, *glossy, whitish*, corymbose above. Lower leaves lyrate ; stem-leaves linear-lanceolate, pinnatiparted into lanceolate spines. Heads oblong, medium ; flowerets purplish — Spring and summer — Damascus ; Jericho.

† † *Inner row of pappus bristly, longer than outer.*

4. C. flavescens, Willd. ⊙ .5 to 1, glabrous ; stem white, corymbose above. Leaves *ovate-lanceolate to lanceolate*, the lower spiny-toothed or lobed, the upper *with short, yellow spines at margin.* Heads ovate, .015 long ; flowerets yellow — June and July — Fields and waste places ; Cœlesyria, Antilebanon, and Damascus, to Palmyra, Aleppo, Aintâb, Marash, and northward.

Var. **stenophyllus,** Post. Leaves linear-lanceolate — Aintâb.

* * *Pappus all composed of bristles.*

5. C. cæruleus, L. ♃ .4 to .5 or more ; stem stiff, leafy, *nearly simple.* Leaves oblong-lanceolate, tapering into a petiole, upper sessile,

all serrate to incised-prickly. Heads terminal, ovate, .015 to .025 long; outer scales of involucre lanceolate, acuminate, margin with short, spiny teeth ; *flowerets blue* — May — Coast about Sidon and Beirût.

* * * *Pappus* 0.

6. C. tinctorius, L. ⊙ Safflower. Saffron. *'Usfur. Za'farân.* 1 to 1.5 ; stem corymbose. Leaves oblong, *serrate-prickly, rarely entire, unarmed.* Heads ovate-conical, .03 long, .025 broad at base ; outer scales of involucre leaf-like, obsoletely prickly at margin, *flowerets red* — June — Cultivated everywhere for its flowerets, which are used as a dye in cooking.

78. CARDUNCELLUS, Ad. CARDUNCELLUS.

Heads homogamous, many- and equal-flowered. Involucre in several rows, the outer scales leaf-like, leathery, spiny, the inner scarious. Receptacle bristly-fringed. Filaments free, pencil-like below tip ; anthers not caudate. Akenes acutely 4-angled, hilum lateral. Bristles of pappus in several rows, nearly equal, long-feathery — Herbs, with blue flowers.

C. eriocephalus, Boiss. ♃ .2 to .3 ; stem nearly simple, 1-headed. Leaves rigid, pinnately lobed, spiny, the lower oblong, the upper lanceolate, acuminate. Head ovate-oblong ; outer scales of involucre lanceolate, cobwebby, inner oblong-lanceolate, fringed toward tip, terminating in a prickle — April — Gaza to Egypt.

79. HOCHSTETTERIA, DC. HOCHSTETTERIA.

Heads homogamous, discoid, flowerets all perfect, fertile. Involucre hemispherical, scales in many rows, narrow, acute, rigid. Receptacle convex, honey-combed, the margins of the cells often produced into short chaff. Corollas regular, tubular, 5-parted, lobes more or less revolute. Anthers sagitate at base, the appendages lanceolate, somewhat ciliate. Branches of style linear, obtuse. Akenes top-shaped, densely villous ; pappus of 10 scales, transparent at lower part of margin, produced into barbed, at length wide-spreading bristles — Rigid, perennial herbs.

H. Schimperi, DC. ♃ Glabrous ; stems angular-striate, with forked branches. Lower leaves ovate, minutely toothed, upper oblong-lanceolate, the uppermost pair just below the involucre. Heads solitary at the end of the branches — Arabia Petræa.

80. SCOLYMUS, L. SCOLYMUS.

Heads many-flowered. Involucre double, the inner of imbricated scales, the outer of spiny leaves. Receptacle chaffy, the chaff enclosing the akenes and adhering to them. Pappus consisting of a thickish, crenate, muticous or 2-bearded margin — Spiny herbs, with lobed-winged stems.

1. S. maculatus, L. ⊙ .5 to 1, corymbose. Leaves oblong, sinuate, spiny-dentate, *with a thick, white margin.* Heads *terminal,* akenes tipped with a very short, crenate, muticous crown — Summer — Coast ; Lebanon ; Jordan Valley.

2. S. Hispanicus, L. ② .5 to 1, racemed or panicled. Leaves oblong-lanceolate, sinuate-pinnatipartite. Heads axillary and terminal; *crown of akenes furnished with two* beards — Summer — Waste places ; common.

81. CATENANCHE, Vaill. Catenanche.

Heads many-flowered. Receptacle honey-combed, fringed with bristles. Involucre imbricated, of many scales. Akenes turbinate, 5-angled, truncate, appressed-hirsute. Pappus composed of 5-7, lanceolate, acuminate, bristle-tipped scales — Herbs, with yellow flowers.

C. lutea, L. ⊙ *Dainet-el-Jidy* .15 to .3 ; stems sparingly branched. Leaves oblanceolate to oblong, entire or sparingly dentate. Heads terminal, solitary, long-peduncled — March and April — Coast and lower mountains.

82. CICHORIUM, L. Succory. Chicory. *Hindibah.*

Heads many-flowered. Receptacle naked, often somewhat honey-combed. Involucre calyculate. Akenes obovate or obpyramidal. Pappus short, consisting of 2-3 rows of pales or bristles — Herbs with blue or pink flowers.

1. C. Intybus, L. ♃ .3 to .6, erect, divaricately branched. Leaves hirsute, the lower runcinate, the terminal segment long, acute ; stem-leaves half-clasping, lanceolate. Lateral heads sessile, in clusters of 2-several, terminal solitary, peduncled ; outer scales of involucre ovate-lanceolate, *inner twice as long*, all more or less *glandular-fringed ;* flowerets thrice as long as involucre; *akenes* 8-10 *times as long as pappus* — May and June — Common.

2. C. divaricatum, Schousb. ⊙ *Maqd. Shikûrîyeh.* .3 to 1 or more ; stem forked, branching from base. Root-leaves dentate to runcinate-pinnatipartite ; stem-leaves *minute, linear.* Lateral heads sessile, clustered, terminal solitary, peduncled, peduncles at length thickened, club-shaped ; outer scales of involucre ovate, obtuse, ciliate or unarmed, *not glandular*, inner much longer ; flowerets thrice as long as involucre ; *pales as long as akenes* — May and June — Coast, and lower mountains, and interior plains.

3. C. glandulosum, Boiss. et Huet. ⊙ .2 to .3 ; stem white, stiff, zigzag, divaricately branched. Lower leaves *ovate-oblong, minutely-toothed*, upper lanceolate, acute. Heads in forks and lateral, 1-3 in a cluster, sessile, the terminal solitary, peduncled, the peduncles at length club-shaped. Scales of involucre *glandular-ciliate, the outer almost as long as the inner ;* flowerets *scarcely twice* as long as involucre ; pales *short-spathulate, one-fifth as long as akene* — Waste places ; Aintâb to Marash, and northward.

83. HYOSERIS, L. Hyoseris.

Heads many-flowered. Receptacle naked. Involucre calyculate ; scales of the true involucre 6-10, hardened in fruit, enclosing the outer akenes. Outer akenes compressed at back, linear, with a pappus of short, scabrous bristles ; intermediate akenes compressed-winged, with

a pappus of short bristles and dilated pales ; inner akenes angular-cylindrical, slender, frequently sterile, sometimes 0 — Stemless herbs.

H. scabra, L. ⊙ .1 to .15 ; root slender ; leaves oblong-linear in outline, pinnatipartite into ovate, toothed segments. Scapes thickened, clup-shaped toward tip. Heads .01 long, .004 broad ; outer scales of involucre one-fifth as long as inner — February to April — Fields ; coast.

84. HEDYPNOIS, Tournef. Hedypnois.

Heads many-flowered. Receptacle naked. Involucre in several rows, the outer scales minute, calyculate, the inner, concave, hardened in fruit, nearly enclosing the marginal akenes. Akenes nearly terete, striate, beakless, the outer tipped with a short, cup-like, ragged-toothed margin, the inner with lanceolate-subulate pales — Annual herbs.

H. Cretica, L. ⊙ .1 to .2 ; stems erect or diffuse, sparingly branched, sometimes reduced to a 1-2-headed scape. Root-leaves obovate to obovate-oblong, sinuate-toothed to pinnatifid — Spring — Fields ; common along coast, and in lower mountains ; Jordan Valley.

Var. **gracilior,** Boiss. .2 to .35. Peduncles slender, scarcely club-shaped at tip — Coast.

85. TOLPIS, Gærtn. Tolpis.

Heads many-flowered. Receptacle naked. Involucre calyculate, scales long and slender. Akenes short, somewhat 4-angled, tapering at base, truncate at apex, either all tipped with a pappus of 2-15 bristles, or the marginal ones with a little crown of very short bristles — Annual or biennial herbs, with dichotomous stems and yellow flowers.

1. T. umbellata, Bertol. ⊙ .3 to .6. Outer scales of involucre *subulate*, inner *lanceolate, shorter ;* outer akenes crowned with short bristles, the rest with 4-5 bristles thrice as long as akenes — Spring — Beirût ; Beitmeri (Lebanon).

2. T. altissima, Pers. Ench. ② .5 to 1. Outer scales of involucre linear, *much shorter than inner ;* akenes *all with a pappus of* 4-12, *long bristles* — July and August — Uncultivated fields ; common.

86. LAPSANA, L. Nipple-Wort.

Heads many-flowered. Involucre in two rows, the outer scales 3-5, very small, the inner 8-10, keel-shaped, convergent in fruit. Receptacle naked. Akenes compressed at back, about 20-striate, ending in a very short, obtuse margin — Annual herbs with yellow flowers.

1. L. communis, L. ⊙ .3 to 1 or more, *panicled.* Root-leaves lyrate ; stem-leaves *ovate,* coarse-dentate, the uppermost lanceolate, entire. Flowerets once and a half as long as involucre—July to September —Woods ; Cassius, and northward.

2. L. peduncularis, Boiss. ⊙ .5 to 1 or more, *dichotomous-corymbose.* Root-leaves lyrate ; stem-leaves few, *lanceolate to linear.* Flowerets twice as long as involucre — June to September — Middle

zone of Lebanon and Antilebanon to Cassius, Amanus, Akherdagh, and northward.

87. KŒLPINIA, Pall. Kœlpinia.

Heads several-flowered. Receptacle naked. Outer involucre of two, very small scales ; scales of true involucre 5-7, in one row, more or less united in fruit. Akenes free, uniform, slender-cylindrical, curved, striate, beset with barbed prickles in rows, the terminal ones 7-9, recurved, wineglass-shaped — Annual herbs, with yellow flowers.

K. linearis, Pall. ⊙ .1 to .2 ; stems erect, dichotomous. Leaves linear-filiform. Flowerets a little longer than involucre ; akenes spreading, twice as long as the linear-lanceolate scales — March and April -- Sandy and waste places from Egypt and Sinai to Jerusalem, Jericho, Antilebanon, Damascus, Palmyra, and northward and eastward.

88. RHAGADIOLUS, Tourn. Rhagadiolus.

Heads several-flowered. Receptacle naked, glabrous. Involucre in two rows, the outer calyculate, of 5, small scales, the inner of 5-8, cylindrical scales, wholly enclosing the marginal akenes, hardened and persistent in fruit. Akenes awl-shaped, somewhat compressed at back, gradually tapering to tip, all bald, the inner not enclosed by scales, caducous, the outer at length spreading in a star shape, persistent — Annual herbs with yellow flowers.

R. stellatus, DC. ⊙ .3 to 1 ; stems erect or diffuse, dichotomous. Leaves tender, the lower lyrate, toothed or nearly entire — Spring —

Var. **hebelænus,** Boiss. Inner akenes pubescent — Fields ; common throughout, except in alpine regions and deserts.

Var. **leiolænus**, Boiss. Inner akenes glabrous. Leaves usually obovate, toothed — Common.

89. GARHADIOLUS, Jaub. Garhadiolus.

Heads several-flowered. Receptacle naked. Involucre in two rows, the outer scales few, very small, calyculate, the inner boat-shaped, enclosing the lower part of the outer akenes, growing and indurated in fruit. Akenes hook-shaped, cylindrical, tapering toward tip, with a small, fringed crown — Low annuals, with yellow flowers.

1. G. Hedypnois, F. et M. ⊙ .05 to .2, *hirtulous to glabrous.* Leaves obovate-oblong, dentate or pinnatifid at base. Peduncles at length thickened ; heads .008 long ; flowerets *scarcely longer* than involucre ; scales in fruit *somewhat divergent* — April and May — Waste fields and barren places ; common.

2. G. hamosus, Boiss. et Haussk. ⊙ .1 to .4, *hispid.* Leaves obovate-oblong to ovate-oblong. Peduncles scarcely thickened ; heads .01 long ; flowerets *twice as long* as involucre, stellate-spreading —May -- Aleppo to Aintâb, and northward.

90. ZACYNTHA, Tourn. Zacyntha.

Heads several-flowered. Outer scales of involucre calyculate, 5, short, the inner 8, becoming gibbous at back in fruit, thickened, hard,

concave, enclosing the outer akenes, and corvergent at tip. Akenes of two forms, the marginal laterally compressed, gibbous at back, tapering into a very short, rather one-sided beak, those of disk beakless, nearly terete. Pappus scabrous, caducous — Annual herbs, with yellow flowers.

Z. verrucosa, Gærtn. ☉ .2 to .3, leafy below, often scape-like, rigid, dichotomous. Root-leaves oblong-obovate, dentate, runcinate or lyrate, the intermediate sagittate at base, the upper linear-setaceous. Heads .005 long, the terminal only peduncled — April to July —Fields and roadsides ; coast, and lower mountains, and interior plains.

91. RODIGIA, Spr. Rodigia.

Heads many-flowered. Involucre calyculate, the outer scales very short. Receptacle beset with linear lanceolate chaff, scarcely shorter than the beaks of the akenes. Akenes uniform, very slender, slightly scabrous, tapering into a beak, that of the inner akenes long, of the outer shorter. Pappus composed of bristles — Annual herbs, with yellow flowers, and aspect of Barkhausia.

R. commutata, Spr. ☉ .1 to .2, dichotomous. Root-leaves petioled, spathulate-oblong, dentate to lyrate ; stem-leaves sessile, lanceolate to linear, auricled and 2-3-fid at base. Heads .01 to .015 long, long-peduncled — May — Palmyrene desert, and northward.

92. PICRIS, L. Picris.

Heads many-flowered. Involucre calyculate. Receptacle naked. Akenes transversely wrinkled, apex tapering, rounded or beaked. Pappus either similar in all the akenes, united in a ring at base, the interior bristles stronger, plumose, the outer fewer, short, or that of the marginal akenes consisting of short bristles more or less united in a cup — Strigose or hirsute, monocarpic or perennial herbs, with yellow flowers.

* *Pappus of all the akenes similar.*

† *Biennials.*

1. P. stricta, Jord. ② 1 or more, rough-hairy ; stem racemose-panicled. Leaves toothed or sinuate, oblong-lanceolate, the radical tapering at base, the upper sessile, half-clasping. Peduncles short ; heads .01 to .014 long ; *akenes contracted at tip into a hemispherical boss* — September — Fields and roadsides, Lebanon ; Antioch ; Amanus, and northward.

2. P. strigosa, M. B. ② .5 to 1 or more, *strigose*, branching from base ; stems slender, acutely striate, angular. Lower leaves oblong-lanceolate, runcinate to lyrate, upper sessile, deflexed, linear. Heads .005 to .008 long, the terminal on *long, slender* peduncles, the lateral more rarely on short peduncles ; akenes tapering into *a very short beak* — Summer — Dry and rocky places ; in mountains to subalpine regions.

† † *Annuals.*

3. P. pauciflora, Willd. ☉ Rough-hairy, erect, sparingly branched. Leaves toothed or nearly entire, the lower oblanceolate,

tapering into a petiole, the upper sessile, linear. *Fruiting peduncles much inflated, contracted beneath heads;* heads medium; akenes gradually tapering into *a thick beak one-fourth their length* — Spring — Hills; Antilebanon; northern Syria.

4. P. Sprengeriana, L. ⊙ .3 to .8; stem erect, divaricately branched. Leaves entire or sinuate-toothed, the radical oblanceolate, tapering to a petiole, the others clasping, appendage at base. Heads .01 long; peduncles *not thickened;* akenes short-tapering, *not beaked* — May to August — Weedy places; coast to middle mountain regions and interior plains.

5. P. Kotschyi, Boiss. ⊙ Rough hairy; stem erect, zigzag, dichotomous-corymbose. Lower leaves oblanceolate, with few teeth, upper linear, entire. *Peduncles gradually thickened above;* heads medium; akenes tapering at both ends, *tipped with a slender beak as long as they* — May — Aleppo.

6. P. cyanocarpa, Boiss. ⊙ *Haudhân.* .1 to .2, densely canescent; *stems simple, or 2-forked, 2-headed.* Root-leaves oblanceolate, sinuate-toothed or coarsely pinnatilobed; stem-leaves 1-2, linear, or 0. Peduncles *not thickened;* heads .015 long; akenes oblong, *bluish-gray, rather abruptly beaked, beak longer than akene* — March and April — Valleys of Sinai.

7. P. sulphurea, Del. ⊙ .3 to .4, rough; stems once or twice forked above. Lower leaves oblanceolate, sparingly sinuate-toothed or pinnatifid; stem-leaves few, linear-lanceolate, entire. Peduncles *not thickened;* heads .01 to .014 long; akenes *gradually tapering into a beak one-fourth their length;* pappus persistent — February to April — Sinai to Egypt.

* * *Pappus of marginal akenes confluent into a fringed cup.*

8. P. radicata, Forsk. ⊙ .15 to .25, rough-papillose. Root-leaves rosetted, oblanceolate, *sinuate-pinnatifid* into rounded or ovate lobes; stem-leaves few, linear. Peduncles long, *scarcely thickened;* heads .015 long; marginal akenes cylindrical, incurved, truncate, disk akenes very small, oblong, rounded or narrowed at tip — March to May — Samaria; Gaza, and southward.

9. P. Damascena, Boiss. et Gaill. ⊙ .2 to .3, hairy; stems low, simple, or forked, 1-2-headed. Leaves small, oblong-linear to linear, sparingly denticulate. Peduncles not thickened; heads .01 long; akenes glabrous, those of margin tapering, *those of disk with a beak half as long as they;* inner bristles of pappus *ten* — April and May — Antilebanon near Damascus, and Damascus.

10. P. Blancheana, Boiss. ⊙ Rough; stems sparingly forked, few-headed. *Stem-leaves lanceolate-linear, entire.* Peduncles not thickened; heads small; akenes slender, those of margin *appressed-hirsute,* tapering, those of disk *with a beak rather shorter than the akene;* inner bristles of pappus *twelve to fifteen* — May — El-Jebel-el-Abiad (Palmyrene desert).

93. HAGIOSERIS, Boiss. Hagioseris.

Heads many-flowered. Involucre in two ranks, the inner scales in fruit hardened, convolute-boat-shaped, tapering, at length deciduous.

Receptacle naked. Marginal akenes incurved, with a cup-like crown, those of disk nearly straight, with one row of 5 pales, dilated at base, feathery above, not united in a ring but close together, rather persistent — Annual herbs with yellow flowers, allied to Picris, but differing in the deciduous scales of the involucre, and the chaffy pappus in 1 row.

H. Galilæa, Boiss. ⊙ .5 to .8, roughish, erect, loosely corymbose. Leaves oblong, repand-toothed, those of stem clasping, with broad, obtuse appendages. Heads .015 long — April and May — Hill country of Palestine, east and west of Jordan.

Var. **diffusa,** Boiss. More strigose; stems thicker, shorter, decumbent; stem-leaves narrower, marginal akenes often appressed-puberulent, those of disk more tapering — May — Coast of Syria and Palestine; Hebron.

94. HELMINTHIA, Juss. Helminthia.

Heads many-flowered. Involucre double, the outer of 3-5, broad, leaf-like scales, the inner of about two rows of narrow scales. Receptacle naked. Akenes terete-compressed, wrinkled, terminating abruptly in a brittle, capillary beak, which separates with the 1-rowed, feathery pappus — Strigose annuals, with yellow flowers.

P. echioides, L. ⊙ .3 to .5; stem thick, forked. Leaves oblong-lanceolate, entire or sinuate-toothed. Heads terminal, .015 long, short peduncled, 2-5 in a cluster — May and June — Waste places; common.

95. CREPIS, L. Crepis.

Heads many-flowered. Involucre calyculate or somewhat imbricated. Receptacle naked, villous or glabrous. Akenes usually similar, terete-columnar or somewhat prismatic, sometimes rather compressed, 10-30-striate, tapering or beaked; rarely the marginal akenes of a different form from the rest. Pappus white, usually soft and flexible — Monacarpic or perennial herbs, with yellow flowers.

* *Akenes nearly similar, tip more or less tapering, not beaked.*

† *Perennials.*

‡ *Branches of root-stock tuber-bearing.*

1. C. bulbosa, L. ♃ .2 to .3. Leaves glabrous, fleshy, oblong-oblanceolate, obtuse, somewhat dentate. Scape with 1 leaf and 1 head — January to April — Sandy and rocky places along coast.

Var. **polycephala,** Boiss. Stems .3 to .5, 2-4-headed — Coast; Hill country of Judea.

‡ ‡ *Root fusiform, vertical. Scapes 1-headed.*

2. C. robertioides, Boiss. ♃ .05 to .1; root-stock scaly. Leaves all radical, linear in outline, pinnatipartite. Scapes numerous, slender; heads .01 long — July to September — Alpine Lebanon and Antilebanon.

‡ ‡ ‡ *Root præmorse. Stem dichotomous.*

3. C. Sieberi, Boiss. ♃ .3 to .6; neck between petioles red-woolly. Leaves glabrescent at upper surface, more or less setulose at

lower, the radical lyrate, with *ovate-triangular to ovate lateral*, and ovate to cordate terminal segments ; stem-leaves few, the lowest somewhat lyrate, the others linear, entire. Peduncles *glandular-pubescent* — Spring — Gilead ; 'Ain Sofar (Lebanon).

4. C. Hierosolymitana, Boiss. ♃ .8 to 1. Leaves tender, somewhat bristly, the radical petioled, lyrate, with *round-ovate lateral*, and ovate terminal segments ; the lower stem-leaf pinnatifid, the rest linear. Peduncles *appressed-puberulent ;* heads .015 long ; akenes *incurved* — May — Rocky places ; coast and mountain regions to 1,000 m.

5. C. Reuteriana, Boiss. ♃ .5 to 1, more or less bristly or glabrescent. Leaves tender, the radical *runcinate-lyrate*, the terminal segment *triangular or lanceolate*, the lateral oblong-triangular ; stem-leaves 1-2, linear-lanceolate. Peduncles *glabrous ;* heads .015 long ; *involucre glabrous ;* akenes *straight* — April to October — Shady places and thickets ; coast ; Lebanon ; Antilebanon.

Var. **alpina,** Boiss. .2 to .3, involucre glandular-hairy — Middle to alpine Lebanon and Antilebanon.

† † *Monocarpic or annual herbs.*

‡ *Scales of involucre hardened in fruit.*

6. C. pulchra, L. ⊙ .6 to 1 ; stem slender, leafy below, naked above, loosely dichotomous-corymbose. Root-leaves oblong-spathulate, usually dentate to runcinate-pinnatifid ; stem-leaves sessile, rounded-truncate or sagittate at base, oblong to linear. Heads .01 long ; involucre glabrous ; akenes linear, the marginal ones roughened, the inner smooth — May — Fields and roadsides ; middle and subalpine Lebanon and Antilebanon to Kurd-Dagh, and northward.

‡ ‡ *Scales of involucre unchanged in fruit.*

7. C. parviflora, Desf. ⊙ *Halâwi* .5 to 1 ; stem slender, zigzag, dichotomous-corymbose. Lower leaves ovate-oblong, repand-toothed to runcinate ; stem-leaves linear-lanceolate to linear, sagittate at base. Peduncles slender, divergent, curved ; heads very small ; involucre appressed-canescent, inner scales obtuse, *bristly-mucronate ;* akenes minute — April to July — Marash, and northward.

* * *Akenes nearly alike, all or the central beaked.*

8. C. neglecta, L. ⊙ .2 to .3 or more, setulose ; stems slender, loosely cymose. Lower leaves obovate-oblong to oblong-lanceolate, dentate to runcinate, the upper sagittate, often pectinate-pinnatifid at base. Heads .006 long ; involucre puberulent ; akenes minute, ending in a beak one-third to one-fourth as long as they, the striæ somewhat wrinkled — Spring — Moab (Paine).

9. C. pterothecoides, Boiss. ⊙ .2 to .3, papillose-glandular, stems dichotomous. Root-leaves rosetted, obovate-oblong, .03 long, dentate to runcinate, upper leaves linear, very small. Heads .02 long ; inner akenes gradually tapering from the middle — May — Antilebanon.

10. C. fœtida, L. ⊙ .1 to .3, more or less hirsute or bristly ; stem erect, leafy, branching, branches erect, loosely 1-4-headed. Root-leaves runcinate-pinnatifid or -parted, sometimes lyrate ; stem-leaves auricled at base, oblong to lanceolate and linear, incised-dentate to

entire. Heads .02 long and broad ; involucre white-woolly and more or less bristly or almost prickly ; inner akenes shorter than their beak, which is about as long as involucre — April to September — Roadsides and fields ; common.

Var. **rhæadifolia,** Boiss. Leaves more divided ; beak of inner akenes often shorter than involucre — Coast ; Lebanon to subalpine regions ; Cœlesyria ; Antilebanon ; Aleppo.

11. C. Bureniana, Boiss. ⊙ .1 to .3, *bristly-hispid ;* stem branching, leafy. Lower leaves oblong-lanceolate, pinnatifid to runcinate ; stem-leaves oblong, pinnatifid ; upper leaves entire. Heads .015 long and broad ; *involucre beset with long bristles ;* inner akenes scabrous, as long as beak, or shorter — April and May — Palmyrene desert to Euphrates, and southward and eastward.

12. C. Arabica, Boiss. ⊙ .1 to .2, bristly-hirsute ; stem dichotomous, branches few-headed. Root-leaves oblong, acutely dentate or pinnatifid to -parted ; stem-leaves very small, setaceous. Heads .008 long ; akenes scabrous — April — Et-Tîh, near Palestine.

13. C. alpina, L. ⊙ .3 to .8 ; stem leafy, grooved, corymbose. Leaves dentate, the lower ovate-oblong, tapering at base, the upper clasping, obtusely auricled, oblong-lanceolate. Peduncles stiff ; heads cylindrical-turbinate, .02 long ; outer scales of involucre short, numerous, calyculate, scarious, ovate, hooded, glabrous, inner linear, bristly, at length thickened, keel-shaped at back, enclosing the outer akenes ; marginal akenes tapering, inner akenes with a beak many times longer than the seed — Summer — Waste places ; coast to alpine Lebanon and Antilebanon, Cassius, Amanus, Aleppo, and northward.

* * * *Akenes tapering or beaked, the marginal keeled or winged at inner face.*

14. C. aculeata, DC. ⊙ ② .3 to .4, cobwebby-puberulent, branching. Lower leaves oblong-lanceolate, cut-toothed or lyrate-pinnatifid, upper linear-lanceolate, entire. Peduncles elongated, with remote scales. Heads .015 long ; outer scales of involucre very short, *lanceolate-linear*, inner with 3-5 prickles at back ; inner akenes *glabrous*, tapering into a beak as long as they — April and May — Sands ; coast ; Tiberias ; Jordan Valley ; ascent from Jordan to 'Ayûn Musa.

15. C. aspera, L. ⊙ .5 to 1 or more ; stems and branches *very rough with rigid, prickly bristles.* Leaves more or less bristly-fringed, the lower oblong-spathulate to oblanceolote, many-toothed ; stem-leaves truncate-auricled at base, triangular-oblong ; upper-leaves linear, entire. Heads .008 long ; outer scales of involucre *ovate*, scarious, small, deciduous ; inner prickly at back ; inner akenes roughish, beak slender, *twice to thrice as long as seed* — April and May — Weedy places ; common.

Var. **inermis,** Boiss. Stems and branches unarmed ; leaves glabrescent ; inner scales of involucre sparingly prickly — Coast ; Lebanon.

96. LAGOSERIS, M.B. Lagoseris.

Heads many-flowered Involucre calyculate, the outer scales short. Receptacle beset with bristles as long as akenes or longer.

Akenes either all alike, tapering slightly or not at all, or the marginal ones unlike the rest, oblong, convex at back, keeled and 2-furrowed or winged at inner face — Annual herbs, with aspect of Crepis, but distinguished by the long bristles of the receptacle.

L. bifida, Vis. ⊙ *Halâwi.* .1 to .3, papillose ; scapes naked, corymbose above. Leaves rosetted, oblong, toothed to somewhat lyrate-pinnatifid ; stem-leaves reduced to linear scales. Heads .01 long and broad ; pappus very fine, deciduous — April to July — Dry fields ; common even in deserts.

97. CYMBOSERIS, Boiss. CYMBOSERIS.

Heads many-flowered. Outer scales of involucre calyculate, inner at length hardened, concave at inner aspect. Receptacle naked. Marginal akene enclosed in scales, somewhat flattened-triquetrous, winged, bald, the inner cylindrical, prismatic, striate, with a dilated, hollow base, and very fine pappus — Annual herbs, distinguished from Crepis by the akenes.

C. Palæstina, Boiss. ⊙ .3 to .8, branched. Leaves tender, the lower petioled, lyrate, the middle and upper clasping, with broad appendages, runcinate-lyrate to oblong-lanceolate — April and May — Weedy places ; common along coast and lower mountains and interior plains.

98. HIERACIUM, L. HAWKWEED.

Heads many-flowered. Involucre imbricated. Receptacle naked. pitted, the borders of the pits sometimes minutely toothed or fringed. Akenes cylindrical, striate, truncate, not tapering. Pappus composed of white or reddish, brittle bristles — Perennial herbs.

* *Akenes small, black ; pappus in* 1 *row of equal, slender bristles.*

1. H. præaltum, Vill. ♃ 1 or more ; root-stock præmorse, *bearing many stolons ;* stems erect, *glabrous or sparingly bristly*, ending in a many-headed corymb, naked or 1-3-leaved below. Leaves oblong to oblong-lanceolate. Heads turbinate, .006 long ; scales of involucre acutish, pubescent and glandular — Summer — Northern Palestine (Tristram).

2. H. Bauhini, Schult. ♃ 1 or more, hispid with long hairs ; root-stock præmorse, stoloniferous ; stems with 1-2 leaves below, naked above. Leaves oblong to oblong-lanceolate. Corymb rather dense, with erect branches ; involucre *strigose-hispid* — Summer — Subalpine Lebanon.

3. H. procerum, Fries. ♃ 1.3 to 1.6 ; root-stock præmorse, *destitute of stolons ;* stem simple, leafy, bristly. Leaves oblong to lanceolate, soft-bristly, the lower drying before flowering. Corymb spreading, many-headed ; heads oblong, minute ; involucre hispid with stellate wool, and glandular or glandless hairs — Summer — Subalpine and alpine Lebanon.

4. H. Balansæ, Boiss. ♃ .6 or more ; root-stock præmorse, *without stolons ;* stems thick, leafy to top, simple or branching into compound corymbs ; stem and leaves hairy. Leaves stellate-flocculent

at lower surface, lanceolate to linear-lanceolate. Pedicels short ; heads globular, very hispid — Summer — Lebanon above Besherri.

* * *Akenes rather large ; pappus in 2 rows, rather rigid, unequal.*

5. H. Libanoticum, Boiss. et Bl. ♃ .2, pale-green, hirsute with wavy, plumose-scabrous hairs ; root-stock short, oblique, clumpy; stems slender, 1-leaved, 1-3-headed. Root-leaves rosetted, oblong, more or less dentate ; stem-leaf lanceolate-linear, sessile, clasping. Heads minute ; scales turning black, beset with wavy hairs — July — Subalpine and alpine Lebanon.

99. ANDRYALA, L. Andryala.

Heads many-flowered. Involucre in 1 row, or with a few, minute, outer scales. Receptacle bristly or sometimes chaffy at margin. Akenes short, columnar-turbinate, tapering at base, 10-ribbed, truncate at tip, minutely toothed by the production of the ribs. Pappus caducous, bristles scabrous-plumose at base — Annual, whitish or rusty-woolly herbs.

A. dentata, Sibth. et Sm. ⊙ .3 to .5 ; stem erect, loosely corymbose. Lower leaves obovate, repand, the rest oblong-lanceolate, dentate to pinnatifid, sessile, with rounded base. Heads .01 long ; involucre hispid — May — Sands along coast.

100. HYPOCHÆRIS, L. Hypochæris.

Heads many-flowered. Involucre imbricated. Pales of receptacle caducous. Akenes wrinkled, either similar, truncate and beakless, or of two forms, the outer truncate or somewhat tapering, beakless, the inner beaked. Pappus either in 1-2 rows of bristles, the inner row plumose, and the outer, when it exists, shorter, bristly, or of two forms, the inner plumose, and the outer changed into a short, fringed crown — Annual or perennial herbs, with yellow flowers

H. glabra, L. ⊙ .2 to .3 ; stems simple or branched. Leaves rosetted, oblong-spathulate, obtusely sinuate or toothed. Heads .01 long — Spring — Coast about Beirût ; Lebanon.

101. LEONTODON, L. Hawkbit. Fall Dandelion.

Heads many-flowered. Involucre imbricated. Receptacle naked. Akenes gradually tapering or clearly beaked, longitudinally striate, sometimes transversely wrinkled. Pappus plumose, persistent ; rays 10 or numerous, sometimes dilated, chaffy at base — Annual or perennial herbs.

* *Annuals. Pappus of* 10 *bristles, dilated at base.*

1. L. hispidulum, Del. ⊙ .1 to .25 ; scapes naked, 1-3-headed, twice to thrice as long as leaves. Leaves rosetted, *lanceolate*, pinnatiparted. Akenes tapering into an *indistinct beak* — April and May — Et-Tîh to Egypt.

Var. **tenuilobum,** Boiss. Segments of leaves linear, sometimes white-mucronate — Palmyrene desert, and eastward.

2. L. Arabicum, Boiss. ⊙ .1 to .25 ; scapes naked, 1-3 times as long as leaves. Leaves rosetted, *linear in outline*, pinnatipartite

into linear-lanceolate lobes. Heads .014 long and broad ; akenes tapering into a *slender beak as long as they* — March and April — Northern borders of et-Tîh ; Gaza ; Palmyra ; east of Aintâb.

* * *Perennials. Pappus of* 15-40 *bristles.*

3. L. Libanoticum, Boiss. ♃ .1 to .2, *whitish with short and forked hairs.* Leaves oblanceolate, wavy-toothed to incised, tapering into a petiole. Heads .015 long ; lower scales of involucre *triangular*, ciliate ; upper lanceolate, elongated ; akenes cylindrical, *tapering toward tip* — July to September — Alpine Lebanon ; Ziaretdagh (Amanus).

4. L. asperrimum, Willd. ♃ .1 to .4, pale-green, hispid with rigid hairs, stellate-forked at tip ; scapes 1-headed, *dilated at tip*, with small, linear to subulate, scattered leaves. Leaves oblong-lanceolate, remotely toothed. Heads .025 long in flower, .005 broad in fruit ; scales of involucre obtuse, the outer *oblong*, the inner lanceolate, elongated, pectinate-fringed at margin and nerve with stout, white hairs ; akenes .025 long, *gradually tapering from middle* — May to July — Subalpine and alpine Lebanon ; Aintâb, and northward and eastward.

102. THRINCIA, Roth. THRINCIA.

Heads many-flowered. Involucre imbricated, outer scales at length somewhat keeled. Receptacle naked. Akenes of margin tapering, beakless, ending in a fringed cup, or bald, the inner slightly beaked, tipped with a pappus of feathery rays, dilated, chaffy at base —Perennial, stemless herbs, with yellow flowers.

T. tuberosa, L. ♃ .1 to .25, more or less bristly with forked hairs ; root-stock very short, præmorse, surrounded by a cluster of fusiform tubers. Leaves oblong-spathulate, dentate to lyrate or runcinate. Scapes 1-headed ; heads .02 long, .015 broad ; scales of involucre lanceolate, more or less hairy at back ; akenes muricate-wrinkled, the outer tapering, the inner a little longer than the beak — Spring — Weedy places ; common to subalpine regions.

103. TARAXACUM, Juss. DANDELION.

Heads many-flowered. Involucre imbricated, nearly calyculate. Receptacle naked. Akenes nearly similar, somewhat compressed-4-angled, striate, scaly-muricate, especially above, rarely smooth, tapering into a small, pyramidal tip, ending in a beak — Perennial, stemless herbs, with yellow flowers.

* *Akenes shorter than the beak, or as long.*

1. T. montanum, C. A. Mey. ♃ Glaucescent ; root vertical. Leaves .15 to .3 long, firm, pinnatifid or - parted, sometimes lyrate, segments triangular, somewhat scythe-shaped. Scapes woolly, 1-headed, or once or twice 2-branched ; heads .025 long ; akenes tapering at each end, muricate, beak slender, *four times as long as akene* — July and August — Stony places ; Amanus, Akherdagh, and nothward and eastward.

2. T. serotinum, W. K. ♃ Glaucous ; root-vertical, thick, scaly. Leaves thickish, crisp-velvety, sometimes woolly, oblong, some-

what petioled, entire, toothed, or runcinate. Scapes 1-headed, thick; heads .025 long; akenes short-tapering at base, *nearly as long as beak* — July to September — Alpine and subalpine Lebanon and Antilebanon, and Antilebanon Plateaus.

3. **T. officinale,** Wigg. ♃ Glabrous or sparingly pubescent; root vertical. Leaves oblong- to linear-lanceolate, runcinate, toothed, or rarely entire. Scapes 1-headed; akenes muricate toward tip, *abruptly contracted* into a pyramid; beak slender, longer than akene — Spring —

Var. **genuinum,** Koch. Leaves deeply lobed or parted. Scales of involucre linear, the outer shorter, deflexed — Lebanon; Damascus; Aintâb, and northward.

Var. **lævigatum,** Bisch. Leaves narrow, runcinate — Northern Lebanon to Damascus, Aleppo, Aintâb, and northward.

Var. **alpinum,** Koch. Plant small; scapes scarcely longer than leaves; heads .006 to .01 long; scales of involucre short, spreading — Middle zone of Lebanon and Antilebanon.

Var. **lividum,** Koch. Leaves entire or pinnatifid; outer scales of involucre ovate, margined — Lebanon; Aintâb.

4. **T. gymnanthum,** Link. ♃ Root thick; neck woolly between the leaves. Leaves glabrous, coming later than flowers, linear-lanceolate, somewhat lyrate-pinnatipartite, segments small, close, triangular. Scapes 1-headed; heads .015 long; akenes wrinkled almost from base, prickly toward tip, abruptly contracted into a pyramid, beak slender, *a little longer than akene*—September to November — Coast to middle Lebanon.

* * *Akenes longer than beak.*

5. **T. Assemani,** Bl. ♃ Root thick. Leaves oblong to linear-lanceolate, entire or toothed to pinnatipartite into triangular segments. Scapes slender, shorter than leaves or longer; heads .01 long; outer scales of involucre membranous, short-lanceolate, inner linear; akenes prismatic, tapering at both ends, smooth or barely muricate above; *beak much shorter than akene* — April to September — Alpine Lebanon; Yebrûd to Qaryetein.

104. CHONDRILLA, L. Chondrilla.

Heads few-flowered, flowerets in two rows. Involucre calyculate, of few scales. Receptacle naked. Akenes 5-angled, 5-ribbed, ribs scaly-muricate toward tip, the upper scales elongated into a little, spreading crown. Beak as long as akene or longer — Biennial herbs, with slender, interlaced branches, at length leafless, and yellow flowers.

Ch. juncea, L. ② 1 or more; stems hispid below, glabrescent above. Root-leaves obovate-oblong, soon withering; stem-leaves linear-lanceolate to linear, entire. Heads solitary or 2-5 in a cluster — Summer — Dry fields; coast to middle mountain regions and interior plains.

105. LACTUCA, L. Lettuce. *Khus.*

Heads 5-∞-flowered. Involucre imbricated, scales sometimes nearly in two rows. Receptacle naked. Akenes similar, compressed

at back, beak long or short, filiform or stout, of the same color as akene or white. Pappus composed of hairs on a disk at the tip of the beak -- Monocarpic or perennial plants, with yellow, pale red or blue flowers, and usually with milky juice.

* *Heads more than 5-flowered, .025 to .03 long. Glabrous-glaucescent plants.*

1. L. Cretica, Desf. ② .8 to 1 or more ; stem thick, terete, panicled. Leaves oblong-lanceolate, the lower tapering into a petiole, the rest half clasping, all usually runcinate with denticulate lobes, rarely undivided ; floral leaves scale-like. Flowers *yellow;* akenes black, ovate, much flattened, one-half to one-third as long as slender, white beak — May — Coast ; Moab ; Antilebanon

2. L. tuberosa, L. ② .8 to 1 or more ; stem thick, terete, racemose-panicled. Leaves obovate-oblong, entire or runcinate, with toothed lobes. Flowers *bluish-purple;* akenes much flattened, oblong, one-third to one-fourth as long as slender, white beak — May — Coast and lower mountains ; Palmyrene desert.

* * *Heads more than 5-flowered, about .01 long. More or less prickly plants.*

3. L. virosa, L. ② 1 or more ; root fusiform, long ; stem leafy, sometimes sparingly aculeate below, panicled above. Leaves horizontal, with aculeolate midrib, the lower obovate, petioled, the upper sagittate at base, obovate-oblong to oblong, mucronate-denticulate, entire or sinuate, rarely somewhat runcinate. Flowers *sulphur-colored;* akenes black, elliptical, flattened, margined, 5-2-ribbed on each side, *as long as white beak* — Summer -- Middle zone of Lebanon. Probably adventive.

4. L. Scariola, L. ⊙ ② 1 to 2 ; stem leafy, panicled, often prickly. Leaves usually prickly, ovate-oblong, mucronate-toothed, or runcinate, with oblong, falcate lobes, rarely entire. Flowers *pale red;* akenes elliptical, 7-9-ribbed on each side ; beak as long as akene or longer — Summer — Fields and hedges ; Sinai ; Lebanon, Cœlesyria, Antilebanon and Damascus to Antioch, Aintâb, Akherdagh, and northward.

Var. **sativa,** Boiss. Usually unarmed ; leaves entire ; panicles densely-corymbose — Lebanon ; Damascus. *The wild state of the Lettuce of the gardens.*

5. L. saligna, L. ② *Libbein-esh-Sheikh.* 1 or more ; stem simple, erect, or several from neck, whitish, racemed-spiked. Leaves prickly or unarmed, linear-lanceolate to linear, the lowest ovate, runcinate-pinnatifid ; stem-leaves usually entire, sagittate at base. Heads on short pedicels ; *flowers yellow or drying violet-blue;* akenes ovate-oblong, 5-7-striate on each side ; beak white, as long as seed to twice as long — Summer -- Fields ; common to subalpine regions.

* * * *Heads more than 5-flowered, minute. Akenes 1-nerved on each side.*

6. L. undulata, Ledeb. ⊙ .2 to .3, glabrous or papillose ; stem or stems corymbose. Root-leaves obovate, toothed or lyrate ; stem-leaves pinnatifid or -parted. *Flowers blue;* akenes rough, transversely wrinkled ; beak setaceous, 3-4 times as long as seed, 2-legged at base — Spring — Foot of Sinai at el-Bustân.

* * * * *Heads more than* 5-*flowered*, 01 *long. Akenes* 5-*nerved on each side.*

7. L. seticuspis, Boiss. ♃ .6 ; stem glabrous, terete, striate, erect, stiff-panicled above. Leaves tender, pale, slightly bristly at lower surface, those of stem with a broad, ovate appendage, clasping, all pinnatisect. Heads long-peduncled, 8-10-flowered ; *flowerets blue;* akenes elliptical, margin thick, inner face concave, outer keeled — Summer — Pine woods ; subalpine Amanus.

* * * * * *Heads 5-flowered, about* .01 *long. Flowers yellow.*

8. L. viminea, L. ② .5 to 1.5 ; stems several or 1, erect, racemose-spiked. Leaves pinnatipartite, the lower short-petioled, the rest long-decurrent, the upper linear, entire. Heads nearly or quite sessile ; akenes lanceolate-linear — August and September — Rocky places ; middle and subalpine Lebanon, Amanus, and northward.

9. L. Orientalis, Boiss. ♄ .3 ; stems white, zigzag ; branches rigid, short, *prickly at tip.* Lower leaves linear-lanceolate, pinnatifid, upper minute, linear, entire or with 1-2 lobes at base, *long decurrent.* Heads sessile ; akenes linear, obscurely beaked — August and September — Middle to alpine zone of mountains, and interior plains.

10. L. triquetra, Labill. ♄ .6 to 1 ; stems terete, decumbent; branches numerous, erect, *triquetrous.* Lower leaves oblong to linear-lanceolate, entire or sparingly toothed, upper linear, very short. Heads sessile ; akenes short-tapering — August and September — Coast to middle mountain zone.

106. CEPHALORRHYNCHUS, Boiss. Cephalorrhynchus.

Heads cylindrical, few-flowered. Involucre imbricated. Receptacle naked. Akenes similar, terete, elliptical ; beak filiform. Pappus hairy, on a disk at the tip of the beak, deciduous with it — Biennial herbs, with tuberous roots, distinguished from Lactuca by not having the akenes compressed.

C. Candolleana, Boiss. ② .3 to .6 ; stems erect, hollow, corymbose above. Lower leaves on dilated petioles, pinnatisect or -parted, upper often entire, lanceolate — Subalpine Lebanon, Antilebanon, Cassius, and northward.

107. PICRIDIUM, Desf. Picridium.

Heads many-flowered. Involucre imbricated. Receptacle naked. Akenes of 2 forms, the outer 4-5-angled, 4-5-grooved, transversely and deeply crenate-wrinkled, the inner gradually tapering from the base, nearly conical, and smooth. Bristles of pappus united in a ring, those of the inner row stouter and longer — Annual and perennial herbs, with yellow flowers.

1. P. Tingitanum, L. ⊙ *Huwwah. Murâr. Shedîd. Nuqd. Libbein. 'Udeid. Durdâ'.* .15 to .3 ; stem thickened, sparingly branched. Lower leaves linear-lanceolate, pinnatifid. Heads .025 long and broad ; scales of involucre with *broad*, white margins, the outer ovate, black-mucronate ; *ligules reddish at outer surface ;* outer akenes truncate at base and tip — March —

Var. **minus,** Boiss. Stems decumbent, usually dwarf ; heads sessile or short-peduncled in the rosette of leaves — Sinai ; et-Tîh ; Judæan desert.

2. P. intermedium, Sch. Bip. ⊙ .3 to .4 ; stem leafy below, sparingly branched. Root-leaves obovate-oblong, entire or repand-lobed, denticulate. Heads rather large, peduncled ; scales of involucre with *narrow*, white margins, the outer minute, ovate ; *ligules of one color ;* outer akenes ovate-oblong, inner obtusely prismatic — Spring — Coast.

3. P. vulgare, Desf. ♃ .4 to .5 ; root bearing several stems. Lower leaves spathulate, sinuate or pinnately lobed or parted, usually toothed. Heads .015 long, peduncled ; scales of involucre with narrow, white margins, the outer ovate, all obtuse ; *ligules pale at outer surface ;* outer akenes oblong, inner obtusely prismatic — February to June — Waste places and roadsides along coast.

4. P. dichotomum, M. B. ♃ .8 to 1 ; neck scaly ; stem stout, striate, forked ; branches elongated, 1-headed. Root-leaves linear-spathulate, somewhat sinuate-lobed, margin crisp-wavy, prickly. Heads .015 long, peduncled ; scales of involucre with narrow, white margins, the outer triangular, acutish, the inner oblong-lanceolate, obtuse ; akenes columnar-tetragonal, 4-grooved, ribs tubercled-dentate — July to September — Dry and stony places ; Lebanon ; northern Syria.

108. SONCHUS, L. Sow-Thistle.

Heads many-flowered. Involucre imbricated. Receptacle naked. Akenes alike, flattened at back or elliptical, beakless. Pappus soft, flexible — Monocarpic or perennial herbs with yellow flowers.

* *Annuals.*

1. S. oleraceus, L. ⊙ .3 to 1, glabrous, erect, sparingly branched ; branches cymose at tip. Leaves oblong, runcinate-pinnatifid to lyrate, rarely undivided, toothed. Scales of involucre lanceolate-linear ; akenes *narrow-margined*, 3-nerved and 3-striate on each side, transversely wrinkled — April to July — Fields ; common.

2. S. asper, Vill. ⊙ As in last, except that the leaves are *prickly-toothed*, and the akenes *broad-margined*, remotely 3-nerved — April to July — Fields ; common.

* * *Biennials or perennials.*

3. S. glaucescens, Jord. ② .3 to 1 ; stem as in last two, but often glandular-hairy above. Leaves prickly-toothed ; akenes smooth, with broad, *retrorsely-ciliate margins* — Summer — Coast of Syria to subalpine Lebanon ; Aintâb.

4. S. tenerrimus, L. ⊙ ② ♃ .3 to .8 ; root-stock somewhat branching ; stem brittle, loosely corymbose, few-headed. Root-leaves pinnatipartite, stem-leaves pinnate to undivided, lanceolate to linear. Involucre often turning black, scales lanceolate ; akenes tapering at base, many-striate, *tubercled-wrinkled, not margined* — January to April — Moist and shady places ; coast and lower zone of mountains ; Jordan Valley.

5. **S. maritimus,** L. ♃ .4 to .6 ; stems hollow, simple or with few branches. Leaves *linear-lanceolate*, entire or with few, sinuate teeth. Scales of involucre broad, obtuse, the outer oblong, the inner oblong-lanceolate ; akenes *with broad and thick margins*, and 3, elevated ribs -- Spring — About Damascus.

109. ZOLLIKOFERIA, DC. Zollikoferia.

Heads many- or few-flowered. Involucre imbricated. Receptacle naked. Akenes of 2 forms, the outer columnar-prismatic, rarely somewhat compressed at back, truncate, rarely somewhat tapering-beaked, velvety or transversely wrinkled-tubercled, the inner white, glabrous or smooth, truncate, not tapering. Pappus soft-hairy, flexible, hairs similar -- Herbs, or shrubs with spiny, interlocked branches, and yellow flowers. Differs from Lactuca and Sonchus in the two sorts of akenes.

* *Herbs. Akenes terete-prismatic, truncate or acutish.*

† *Heads ovate. Outer akenes velvety, smooth.*

1. **Z. mucronata,** Forsk. ♃ .5 to .8, glabrous ; stem erect, dichotomous, and loosely corymbose. Lower leaves petioled, lanceolate in outline, bipinnatipartite or -lobed, lobes oblong to linear, mucronate ; stem-leaves oblong, auricled-toothed or many-cleft at base. Scales of involucre white-margined, ovate to oblong, tip of outer ones contracted into an obtuse prickle ; akenes 4-*horned at base ;* pappus *persistent, longer than akene* — April and May —Jordan Valley to et-Tîh, Sinai, and Egypt.

2. **Z. tenuiloba,** Boiss. ② *Ya'dîd.* .1 to .3, glabrous ; stem branching from neck. Root-leaves rosetted, elongated, pinnatipartite into slender, linear, entire or sparingly denticulate, white-mucronate lobes ; stem-leaves with minute appendages at base. Outer scales of involucre ovate, abruptly white-tipped, inner linear-lanceolate ; pappus persistent, as long as akene — Spring — Coast from Beirût southward to et-Tîh.

3. **Z. Arabica,** Boiss. ② *Ḥaudhân. Yamrûr. 'Udeid. Ḥadîdeh. Mureir.* .03 to .2, glabrous, branching from base ; stems thick, 1-4-headed. Leaves oblong-lanceolate in outline, pectinate-pinnatifid into oblong, callous-toothed lobes. Scales of involucre herbaceous, *not margined*, orbicular to elliptical and oblong, obtusely callous-tipped ; akenes silky, 4-angled, *hirsute at angles*, the short pappus persistent, longer than akene — March and April — Sinai and et-Tîh.

† † *Herbs. Heads cylindrical. Outer akenes wrinkled-muricate.*

4. **Z. nudicaulis,** L. ♃ .3 to .5, loosely corymbose above. Root-leaves rosetted, oblong- to linear-spathulate in outline, runcinate, lobes cartilaginous-toothed ; stem-leaves few, small, *at the lower forks.* Heads short-pedicelled ; scales with broad, white margins, the lower triangular, *with a minute, spathulate-dilated tip ;* akenes scarcely compressed, 5-6-furrowed, *obtuse at tip* and obtusely ribbed ; pappus persistent — March — Sinai to Egypt.

5. **Z. fallax,** Jaub. et Sp. ♃ *Marûrah. Ḥuwwah.* .3 to .4, loosely corymbose. Root-leaves rosetted, oblong- to linear-spathulate in outline, runcinate, lobes cartilaginous-toothed. Scales of involucre

obtuse, with broad, white margins, the lower *triangular-ovate ;* akenes nearly 4-angled, the outer black, *acutish at tip ;* pappus *very caducous* — February to April — Sinai to Egypt, and eastward.

* * *Herbs. Akenes rather compressed, the outer tapering or beaked, transversely wrinkled.*

6. Z. Massavensis, Fresen. ⊙ .3 to .5, glabrous ; stem erect, slender, fragile, leafy below, much-branched, paniculate-corymbose above. Leaves tender, runcinate into ovate, bristly-toothed lobes, the lower short-petioled, the rest sessile, broad-auricled. Pedicels *filiform ;* lower scales of involucre calyx-like, short, ovate, the true scales 5, five-times as long, linear ; akenes obtusely 4-lobed at base, the outer black, the inner white, nearly 4-angled ; pappus persistent, longer than akene — April — Arabia Petræa.

* * * *Herbs. Akenes short, fungous, flattened, truncate-retuse, winged at angles.*

7. Z. glomerata, Cass. ② *Halâwat-el-Ghazlân. Ḥûwwah. Ḥûwwat-el-Kilâb. Ḥufeifah.* .05 to .15 ; stems scape-like, simple or 2-forked. Root-leaves rosetted, oblong, tapering at base, runcinate-pinnatifid ; stem-leaves 1 to 2 or 0. Heads nearly sessile, *the terminal clustered,* the lateral usually solitary ; scales of involucre with a broad, white margin, and *a narrow, herbaceous centre* — March and April — Sinai to Egypt, and eastward.

* * * * *Intricately branched, spinescent shrubs. Akenes somewhat dorsally flattened.*

8. Z. spinosa, Forsk. ♄ *Kebâdeh. Zagweh.* .3 to .5. Leaves linear, glaucous, soon falling. Heads few, solitary, nearly sessile, oblong-cylindrical, few-flowered —February to April — Sinai, and southward.

110. TRAGOPOGON, L. Tragopogon.

Heads many-flowered. Involucre simple, scales 5-16, about equal, and somewhat united at base. Receptacle naked. Akenes tapering-beaked, the marginal ones nearly always scaly or muricate. Pappus similar, feathery, interlaced.

* *Flowerets pink or violet.*

1. T. longirostre, Bisch. ② .3 to .5, glabrous or slightly flocculent-woolly ; stems erect, simple or branching. Leaves more or less dilated at base, half-clasping, linear. Peduncles gradually dilated ; scales of involucre about 8, longer than flowerets ; marginal akenes striate, scaly ; beak slender, contracted below their woolly, thickened tip, once and a half to twice as long as seed —April to July — Fields ; common.

Var. **abbreviatum,** Boiss. Beak scarcely longer than seed — Marash.

* * *Flowerets yellow.*

2. T. buphtalmoides, Boiss. ♃ *Dhanab-el-Faras. Mishshah.* .3 to .5, flocculent-woolly, at length glabrescent ; stem simple or branching. Leaves 5-7-nerved, lanceolate to linear. Peduncles scarcely thickened ; scales of involucre 8-10, *one-fourth shorter* than the mar-

ginal flowerets ; marginal akenes abruptly beaked, deeply 5-furrowed and -ribbed, ribs prominent, wing-like, transversely striate ; beak *shorter than seed ;* central akenes indistinctly beaked, smoothish —April to July — Fields ; common to subalpine regions.

Var. **latifolium,** Boiss. Leaves lanceolate, the uppermost ovate-oblong — May — Lebanon ; Cœlesyria ; Antilebanon ; Damascus. Less common than type.

Var. **stenophyllum,** Boiss. .25 to .35. Leaves narrow, the upper short — Nearly as common as type.

Var. **humile,** Boiss. .1 to .25. Leaves as in last. Heads .02 long — Subalpine regions ; interior plains.

3. T. pterocarpum, DC. ♃ .3, glabrous ; stem leafy. Leaves elongated, linear, 5-7-nerved. Scales of involucre 6-7, elongated ; marginal akenes oblong, 5-*winged*, *wings truncate at tip*, beak acute-angled, *twice as long as seed ;* inner akenes slender, wingless, angular-striate, slightly muricate, tapering — Summer — Amanus.

111. GEROPOGON, L. GEROPOGON.

Heads many-flowered. Involucre simple, of 8 scales in one row. Receptacle honey-combed, hairy at margin. Akenes gradually tapering into a long beak, the marginal ones tipped with 5, scabrous pales, the central with feathery, interlaced pappus —Annual herbs with aspect of Tragopogon.

G. glabrum, L. .2 to .5, glabrous or sparingly hairy ; stem erect, terete. Leaves linear, the lower dilated at base, the upper half-clasping. Peduncles hollow, at length thickened ; scales of involucre linear-lanceolate, longer than *pink or violet* flowerets ; akenes striate, scabrous.

112. UROSPERMUM, Juss. UROSPERMUM.

Heads many-flowered. Involucre bell-shaped, the scales 8-10 in one row, united below. Receptacle naked. Akenes similar, compressed, covered with muricate scales, ending in a hollow beak jointed at base and separated from the seed by a partition. Pappus similar, in one row, feathery, not interlaced — Annual herbs.

U. picroides, L. ⊙ .3 to .5, more or less setulose. Leaves oblong-spathulate, entire, pinnatifid or lyrate, those of stem auricled-clasping, the upper lanceolate to linear. Heads .02 long, at first conical, then campanulate ; base of beak ovate, inflated, tip filiform — March to July — Fields and roadsides ; common.

113. SCORZONERA, L. SALSIFY. OYSTER PLANT.

Heads many-flowered. Involucre imbricated. Receptacle naked. Akenes supported at base by a hollow stalk surrounding the hilum, either very short and indistinct, or elongated and rather inflated. Pappus feathery to tip, interlaced, or feathery at base and scabrous at tip or scabrous from base to tip — Herbs, rarely woody at base.

* *Akenes glabrous, borne on a distinct, usually inflated stalk.*

1. S. Jacquiniana, Koch. ♃ .25 to .4 ; neck bearing sterile and flowering stems, the latter branching or simple. Heads .02 long and broad ; inner scales of involucre appressed-puberulent within ; marginal flowerets once and a half to twice as long as involucre ; akenes angular-striate, rather shorter than pappus — April and May — Fields ; Lebanon, Cœlesyria and Antilebanon, Cassius, and northward.

* * *Akenes glabrous ; stalk almost* 0, *or short, or long but not inflated.*

† *Stems scape-like or few-branched ; leaves mostly radical.*

2. S. mollis, M. B. ♃ Appressed-cobwebby, canescent ; root vertical, *tuberous ;* neck sheathed in the remains of the petioles ; stems simple or branched, densely leafy below. Leaves linear, elongated, sheathing at base, *zigzag, recurved, and usually wavy-margined.* Peduncles at length thickened at apex ; heads .02 to .03 long ; scales of involucre few, very unequal, ovate to lanceolate ; flowerets *yellow, reddish without, once and a half as long as involucre ;* akenes 5-furrowed, scaly-muricate, rather longer than *white* pappus — Spring — Dry places ; Lebanon, Antilebanon, Damascus, Nusairy Mountains, Palmyrene desert, Aintâb, and northward.

3. S. phæopappa, Boiss. ♃ Glabrous or sparingly cobwebby-canescent ; root-vertical, *spindle-shaped ;* neck sheathed with remains of petioles ; stems simple or somewhat branching. Heads .03 to .04 long ; flowerets *lilac ;* akenes striate, somewhat tapering from base to apex, scaly-muricate, shorter than or as long as *smoky* pappus — April and May — Hûleh and Haurân to Cœlesyria, Antilebanon, Palmyrene desert, Aintâb, and north-eastward.

Var. **minor,** Boiss. Stems shorter ; heads smaller ; akenes shorter — Lebanon and Antilebanon to Damascus, and northern Syria.

4. S. verrucosa, Boiss. ♃ .25 to .5, cobwebby-canescent to glabrescent ; *root cylindrical, slender.* Leaves *grass-like, linear,* wavy. Scapes 1-headed, with a few, scattered leaves ; fruiting heads .03 long ; scales of involucre glabrescent, lanceolate, obtuse ; outer akenes with a stalk *nearly half as long as they, echinate with transverse, warty scales,* the inner nearly smooth ; pappus dingy-white, somewhat longer than akene — May and June — Wadi Qondîl (base of Cassius), and northward.

† † *Stems leafy, branching.*

5. S. papposa, DC. ♃ .3 to .5, cobwebby with detersile wool, then glabrescent. Leaves often wavy-margined, the lower oblong, tapering to a petiole, the middle half-clasping, long-tapering toward tip, the upper linear-lanceolate. Heads .03 to .04 long ; scales of involucre white-margined, the outer orbicular to ovate, the inner oblong-lanceolate ; flowerets lilac ; akenes .01 or less long, acutely 4-angled, muricate ; pappus white, densely feathery, rather longer than seed — Spring — Hills and argillaceous fields ; deserts ; middle zone of mountains ; interior plains ; Jordan Valley.

6. S. Libanotica, Boiss. ♃ .3 to .5, flocculent with detersile wool ; root vertical ; neck very scaly ; stems branching. Lower leaves oblong to oblong-lanceolate, *sometimes denticulate,* acuminate, tapering

into a petiole ; stem-leaves clasping, lanceolate. Heads .03 to .035 long ; base of involucre truncate ; scales ovate-cordate to oblong ; flowerets yellow toward tip, dark purple at base ; akenes .02 long, thick-ribbed and deeply furrowed, ribs of outer ones *wavy-toothed ;* pappus dirty white, *shorter than seed* — April to June — Subalpine and alpine Lebanon, and Antilebanon. A showy species.

7. S. parviflora, Jacq. ♃ .3 to .4 ; root-stock short, *præmorse*, with two to three cylindrical fibres ; neck nearly naked ; stem rather bare, usually 1-headed. Root-leaves linear-lanceolate, with broad petioles ; stem-leaves 1-3, linear, the upper very small. Heads .02 to .03 long ; marginal flowerets a little longer than involucre ; akenes short, angled, white, obsoletely tubercled, *half as long* as white, caducous pappus — April — Merj (Damascus).

† † † *Tufted ; root-stock woody ; leaves linear. Pappus plumose below, scabrous toward tip.*

8. S. Makmeliana, Boiss. ♃ .05 to .15 ; stems rigid, 1-2-headed. Heads .015 long, *short-peduncled ;* scales of involucre woolly, somewhat spreading, triangular to lanceolate ; flowerets yellow, the outer reddish without, about one-fourth longer than involucre ; akenes striate, *shorter than reddish-brown pappus* — July to September —Alpine Lebanon and Antilebanon. Too near *S. pygmæa*, Sibth. et. Sm.

9. S. rigida, Auch. ♃ .1 to .2, appressed-canescent ; stems rigid, slender, simple, 1-headed, or few-branched, taller than length of leaves. Heads .01 to .013 long ; flowerets yellow, the outer about one-third longer than involucre ; akenes obtusely ribbed, furrowed, *longer than dirty white pappus* — September — Alpine Lebanon.

* * *Akenes woolly or villous along their whole length. Pappus plumose.*

† *Root tuberous. Flowerets yellow.*

10. S. lanata, M. B. ♃ *Mussah. Dhebaḥlîl.* .1 to .25, tufted, *woolly*. Leaves linear-lanceolate to linear, about as long as 1-headed scapes. Heads .015 long ; scales of involucre lanceolate, *nearly equal*, as long as yellow flowerets ; pappus reddish, *four times as long as akenes* — March and April —Argillaceous soil ; et-Tîh ; Damascus to Palmyra, Aleppo, and north-eastward.

11. S. Kenisæa, Boiss. (Suppl. Fl. Or. 321). ♃ .06 to .12, appressed-canescent, glaucous ; stems leafy, racemed almost from base. Leaves 3-nerved, the lower oblong-lanceolate, acute, .015 to .02 long, .006 to .008 broad, the upper linear-lanceolate, acuminate. Peduncles ascending, long ; heads .012 to .015 long ; outer scales of involucre triangular-acuminate, short, inner lanceolate, canescent, one-third longer than scales ; pappus reddish, *somewhat shorter than akene* — Summer — East face of Jebel Kenîseh.

† † *Root cylindrical or fusiform. Flowerets yellow.*

12. S. Kotschyi, Boiss. ♃ .15 to .25, flocculent below, glabrescent above ; stems leafy below, sometimes branching. Leaves grass-like. Peduncles long ; heads .02 long ; scales of involucre membranous at margin, the outer ovate, the inner oblong to elliptical ; flowerets one-third longer than scales ; pappus tawny, *once and a half as long as akene* — May — Antioch to Aleppo, Aintâb, and north-eastward.

SYSTEMATIC SYNOPSIS.

SUBORDER I. **TUBULIFLORÆ.**

TRIBE I. **EUPATORIACEÆ.** Heads discoid. Flowerets all alike, tubular. Anthers nearly entire at base. Branches of style long, nearly terete or club-shaped, with short papillæ.

1. EUPATORIUM. Tall herbs. Leaves pinnatipartite into 3, ovate to lanceolate leaflets.

TRIBE II. **ASTEROIDEÆ.** Heads radiate or discoid. Anthers obtuse at base and entire. Branches of style in the perfect flowers rather flat, but commonly with a prominent margin formed by the termination of the stigmatic lines, and terminating in lanceolate or triangular, papillose appendages. Receptacle (in ours) naked

2. SOLIDAGO. ♃ Flowers radiate, yellow, in a simple or paniculate, leafy raceme. Leaves simple,
3. BELLIS. ⊙ ♃ Flowers radiate, pinkish-white, on scapes or branching stems.
4. ERIGERON. ⊙ ② ♃ Flowers radiate or discoid, pinkish-white to purplish. Rays in several rows. Leaves simple or lobed.

TRIBE III. **INULOIDEÆ.** Heads various. Anthers caudate or bristly at base. Branches of the style in the perfect flowers linear, obtuse, more rarely truncate, often club-shaped, somewhat flattened; the style of the sterile, marginal flowers undivided.

SUBTRIBE I. **PLUCHEINEÆ.** Heads discoid, flowers all tubular, those of the margin pistillate, filiform. Receptacle naked.

5. CONYZA. ♃ A tall shrubby plant, with ovate-oblong leaves, and corymbose flowers.

SUBTRIBE II. **FILAGINEÆ.** Heads of both staminate and pistillate flowers collected into clusters, the marginal flowers subtended by the pales of the receptacle, the central frequently naked. Scales of the involucre commonly scarious or translucent; branches of style obtuse. Akenes small, ribless. Woolly herbs.

6. EVAX. ⊙ Stemless or caulescent, minute herbs, with headlets crowded into flattened, hemispherical heads.
7. MICROPUS. ⊙ Stemmed herbs, with headlets crowded into small, nearly spherical racemed or panicled heads.
8. FILAGO. ⊙ Stemmed herbs, with solitary, clustered or crowded, corymbed, racemed, or panicled headlets.
9. IFLOGA. ⊙ Stemmed herbs, with headlets 2-3-clustered in axils of linear leaves, forming a dense interrupted spike from base to apex of plant.

SUBTRIBE III. **GNAPHALIEÆ.** Heads various, Involucre of scarious, translucent scales, the inner sometimes ray-like, Receptacle naked. Branches of the style in the perfect flowers usually truncate. Woolly plants.

SERIES I. **EUGNAPHALIEÆ.** Scales of involucre not ray-like.

10. LASIOPOGON. ⊙ Minute, moss-like plants, with headlets clustered in terminal, globular heads, hidden by long wool.
11. PHAGNALON. ♄ Low herbs with shrubby base, and solitary, long-peduncled heads.
12. GNAPHALIUM. ⊙ Herbs with corymbose branches, and headlets in dense cymes.

SERIES II. **HELICHRYSEÆ.** Scales of the involucre scarious, the inner at least often colored, ray-like or petaloid.

13. HELICHRYSUM. ♃ ♄ Involucre scarious, red or yellow, as long as flowerets, or silvery-white, the intermediate scales radiating.

SUBTRIBE IV. **ATHRIXIEÆ.** Heads radiate. Branches of style truncate at apex, Receptacle naked or with fibrous chaff at margin.

14. LEYSSERA. ⊙ A small desert plant, with filiform leaves, and axillary or terminal, obconical-oblong, .005 long heads.

SUBTRIBE V. **EUINULEÆ.** Heads various. Receptacle naked. Branches of style rounded at apex or obtuse. Flowers yellow,

15. INULA, ⊙ ② ♃ ♄ Unarmed herbs or shrubby below.

16. IPHIONA. ♄ Erinaceous shrubs with needle-like, pinnatipartite leaves.
17. VARTHEMIA. ♄ Unarmed, much branched shrubs, with small, discoid heads.
18. PULICARIA. ♃ Unarmed herbs, with .01 to .025 broad, showy, radiate heads.
19. FRANCŒURIA. ♄ Unarmed, desert shrubs, with aspect of Pulicaria undulata, but with .005 broad heads.

SUBTRIBE VI. **BUPHTHALMEÆ.** Heads various. Flowerets fertile or the marginal ones sometimes sterile. Receptacle chaffy or bristly. Branches of style obtuse.

* *Involucre at length nearly globular, indurated. Flowers yellow.*

20. GYMNARRHENA. ⊙ Stemless or nearly stemless, desert herbs, with heads crowded above the neck.
21. ANVILLÆA. ♄ Branching shrubs, with aspect of Asteriscus graveolens.

* * *Involucre hemispherical, outer rows of scales herbaceous. Flowers yellow.*

22. ASTERISCUS. ⊙ ♃ Unarmed herbs with .02 to .03 broad, radiate heads.
23. PALLENIS. ⊙ Herbs with aspect of Asteriscus, but the tips of scales spiny.
24. CHRYSOPHTHALMUM. ♃ Unarmed herbs, with .01 broad, discoid heads.
25. POSTIA. ♄ Woolly herbs, with shrubby base, and .006 to .02 broad, radiate or discoid heads.

TRIBE IV. **AMBROSIEÆ.** Monœcious. Staminate heads many-flowered, pistillate 1-2-flowered. Anthers nearly free, somewhat curved at tip. Style of sterile flowerets undivided, of fertile 2-cleft into filiform branches. Akenes bald, enclosed in the hardened involucre.

26. AMBROSIA. ⊙ Maritime herbs, with terminal spikes of minute heads, the lower pistillate, the upper staminate.
27. XANTHIUM. ⊙ Herbs growing in waste places, with solitary or racemed, sessile, prickly, ovoid heads.

TRIBE V. **HELIANTHEÆ.** Heads heterogamous or homogamous. Anthers not caudate at base. Branches of style truncate or with short appendages. Receptacle chaffy. Pappus beard-like or 0. Leaves opposite.

28. ECLIPTA. ⊙ Rays white. Leaves nearly entire.
29. BIDENS. ⊙ Heads discoid or white-rayed. Leaves tripartite.

TRIBE VI. **ANTHEMIDEÆ.** Heads heterogamous or homogamous. Anthers without appendages. Branches of style truncate at tip. Pappus crown-like or chaffy, never bristly or hairy, sometimes 0.

SUBTRIBE I. **EUANTHEMIDEÆ.** Receptacle chaffy.

30. ANACYCLUS. ⊙ Rays white or yellow. Leaves 1-2-pinnatiparted. Akenes flattened, with a pellucid auricle in place of pappus.
31. ACHILLÆA. ♃ ♄ Rays white or yellow or 0. Leaves undivided, or narrow, with imbricated, transverse lobes, or dissected. Akenes compressed.
32. DIOTIS. ♃ White-woolly, maritime herbs, with entire or crenulate, ovate or oblong leaves, and discoid, yellow flowers.
33. ANTHEMIS. ⊙ ♃ Rays usually white (*A. Scariosa* yellow). Leaves (except *A. leucanthemifolia*) dissected or pinnatifid. Akenes angled.
34. CHAMÆMELUM. ⊙ ♃ Heads discoid or radiate, rays white. Leaves dissected. Akenes obpyramidal or somewhat compressed, 3-ribbed at inner face.
35. ORMENIS. ⊙ Resembles Anthemis, but the corolla-tube 2-winged, 2-spurred at the base in the rays, and winged at base in the disk-flowerets, and produced into an oblong-lanceolate horn enclosing the akenes.

SUBTRIBE II. **CHRYSANTHEMEÆ.** Receptacle not chaffy.

36. CHRYSANTHEMUM. ⊙ Rays yellow. Leaves undivided or pinnatipartite. Marginal akenes triquetrous or 3-winged. Disk-akenes top-shaped.

37. PYRETHRUM. ♃ ♄ Rays white or yellow or 0. Leaves pectinate or dissected. Akenes prismatic or turbinate, ribbed, crowned.

38. MATRICARIA. ⊙ Heads discoid or white-rayed. Leaves dissected. Akenes teretish, 3-5-ribbed at inner face, bald, or crowned. Fragrant herbs.

39. BROCCHIA. ⊙ Greyish, desert herbs, with pinnatifid leaves and small, discoid heads resembling those of *Cotula*.

40. ARTEMISIA. ⊙ ♄ Heads discoid, panicled. Leaves dissected, rarely simple. Akenes obovate, bald.

TRIBE VII. **SENECIONIDÆ.** Heads heterogamous, rarely homogamous. Scales of involucre commonly 1-2-rowed, usually with a few accessory scales at base. Receptacle generally naked. Anthers-short-sagittate at base, not caudate. Branches of style truncate or appendaged at tip, or filiform-club-shaped. Pappus bristly, hairy, or 0.

* *Branches of style flattened or filiform-club-shaped. Rays yellow.*

41. TUSSILAGO. ♃ Stems 1-headed, scape-like, leaves cordate-orbicular.

* * *Branches of style truncate, pennicillate or appendaged. Rays yellow.*

42. DORONICUM. ♃ Scales of involucre in 2-3 rows. Marginal akenes bald.

43. SENECIO. ⊙ ② ♃ Scales of involucre in 1 row. All the akenes pappose.

TRIBE VIII. **CALENDULACEÆ.** Heads commonly radiate, the marginal flowerets pistillate, the disk flowerets sterile. Anthers sagittate at base. Style of the pistillate flowers with truncate branches, of the sterile undivided. Akenes large, bald (in *Dipterocome* with a pappus of few bristles). Receptacle naked.

44. CALENDULA. ⊙ ② ♃ Rays yellow or orange. Leaves undivided. Akenes curved, beaked, often inflated.

45. DIPTEROCOME. ⊙ Low, desert herbs resembling Kœlpinia, with minute, sessile, discoid heads, and echinate akenes ending in two horns.

46. TRIPTERIS. ♄ Low, desert shrubs, with small heads, yellow rays, and 3-winged akenes.

TRIBE IX. **GUNDELIEÆ.** Headlets several-flowered, aggregated into a large, globular, compound head. Scales of involucre and bracts prickly, closely united. Anthers sagittate. Branches of style rough, somewhat flattened. Pappus cup-like.

47. GUNDELIA. Headlets 5-7-flowered, the central floweret fertile.

TRIBE X. **CYNAREÆ.** Heads homogamous, flowers tubular, perfect, rarely heterogamous, with marginal flowers 2-lipped or strap-shaped, neutral or sometimes pistillate, Receptacle usually densely bristly or chaffy. Anthers sagittate at base. Style thickened under the short, usually erect branches, or surrounded by a ring of hairs.

SUBTRIBE I. **ECHINOPSIDÆ.** Headlets 1-flowered, crowded into dense, globular or hemispherical heads.

48. ECHINOPS. ♃ Compound heads spherical, densely spiny. Leaves pinnatisect, spiny.

49. ACANTHOLEPIS. ⊙ Desert herbs. Compound heads hemispherical, with spinescent involucre. Leaves linear-lanceolate, weak-prickly.

SUBTRIBE II. **CARLINEÆ.** Heads several-∞-flowered. Akenes silky or downy. Pappus chaffy, chaff sometimes finely cleft.

50. CARDOPATIUM. ♃ Very spiny, low herbs, with numerous, subsessile, spiny heads, in terminal, corymbose cymes. Flowerets blue.

51. XERANTHEMUM. ⊙ Unarmed herbs, with entire leaves, and scarious involucre, the inner scales radiating, pink or pallid.

52. CHARDINIA. ⊙ Unarmed herbs, with entire leaves, and scarious involucre, all the scales appressed, silvery-white.

53. SIEBERA. ⊙ Herbs with aspect of 51 and 52, but the inner scales of involucre spiny in fruit.

54. CARLINA. ⊙ ② ♃ Leaves and involucre spiny, the inner rows of involucre radiating.

55. ATRACTYLIS. ⊙ ♃ Leaves and involucre spiny, the latter double, the inner rows of inner involucre not radiating.

SUBTRIBE III. **CARDUINEÆ.** Akenes glabrous (except *Stæhelina*), the hilum at base straight or oblique. Pappus bristly or slightly chaffy at base, caducous or 0.

* *Filaments free, glabrous, or hairy. Bristles of pappus separate, equal.*

56. LAPPA. ② Unarmed herbs, the scales of the involucre tipped with a hook.

57. COUSINIA. ♃ ② Spiny herbs.

* * *Filaments free, papillose-hairy, or glabrescent. Pappus united in a ring at base, equal.*

58. CARDUUS. ② ⊙ Prickly herbs. Pappus scabrous, Receptacle fringed.

59. CIRSIUM. ⊙ ② ♃ Prickly herbs. Pappus plumose. Receptacle fringed.

60. NOTOBASIS. ⊙ Prickly herbs. Pappus plumose. Receptacle linear-paleaceous.

61. CHAMÆPEUCE. ♄ Unarmed shrubs, with linear-filiform leaves. Pappus plumose.

62. ONOPORDON. ② Prickly herbs, with large heads. Tip of anther subulate.

63. CYNARA. ♃ Prickly herbs, with large heads. Tip of anther obtuse. Pappus plumose.

* * * *Filaments united in a sheath, glabrous, hirsute at base, or papillose. Pappus equal.*

64. SILYBUM. ② Spiny herbs, with large heads. Scales of involucre prickly at margin and tip.

65. TYRIMNUS. ⊙ Soft-prickly herbs, with small heads. Scales of involucre prickly only at tip.

* * * * *Filaments free, glabrous. Pappus unequal.*

† *Pappus nearly in 1 row, sometimes with a few, small bristles outside.*

66. STÆHELINA. ♄ Unarmed herbs, with lanceolate to linear leaves and oblong-cylindrical heads.

† † *Pappus of ∞ rows, gradually increasing in length from without inward.*

67. JURINEA. ♃ ♄ Leaves undivided. Scales of involucre prickly-mucronate or -tipped. Pappus caducous.

SUBTRIBE IV. **CENTAUREÆ.** Akenes usually glabrous, hilum oblique or lateral. Pappus chaffy, bristly, or 0.

* *Heads naked at base (except a few Centaureæ, and Cnicus).*

68. SERRATULA. ♃ Unarmed. Stem-leaves undivided or pinnatisect. Heads discoid, oblong-ovate to oblong, .02 to .04 long.

69. CRUPINA. ⊙ Unarmed. Leaves 1-2-pinnatiparted. Heads discoid, oblong, few-flowered, .01 to .02 long.

70. AMBERBOA. ⊙ Unarmed. Leaves pinnatisect. Heads rayed, ovate, few-flowered, .01 long.

71. ZOEGEA. ⊙ Unarmed. Heads radiate, rays saffron-colored to white, .03 to .04 broad; tip of akene concentrically grooved.

72. CENTAUREA. ⊙ ♃ ♄ Unarmed or spiny herbs, rarely shrubs. Pappus of two sorts, the outer of several rows of bristles or pales, the inner of 1 row of short, connivent pales.

73. CNICUS. ⊙ Low. Leaves sinuate-pinnatifid. Heads large. Scales of involucre tipped with a pinnate spine.

74. RHAPONTICUM. ♃ Dwarf plants, with rosetted, 2-pinnatisect leaves, and ovate heads. Scales of involucre spiny-tipped. Flowerets pink.

75. PHÆOPAPPUS. ♃ ♄ Scales of involucre more or less spiny. Flowerets yellow. Pappus of one kind, gradually longer from without inward.

76. PTOSIMOPAPPUS. ♄ Tall, unarmed. Flowerets yellow. Pappus caducous, nearly in 1 row of equal, scabrous hairs.

* * *Heads subtended by leaf-like or spiny bracts.*

77. CARTHAMUS. ☉ ② ♃ Pales or bristles of pappus scabrido-serrulate.

78. CARDUNCELLUS. ♃ Pappus long-plumose.

TRIBE XI. **MUTISIACEÆ.** Heads discoid, flowerets all perfect, fertile. Receptacle honey-combed. Corolla regular, tubular, 5-parted. Anthers sagittate at base, appendages long-lanceolate. Branches of style linear, obtuse, flat.

79. HOCHSTETTERIA. ♃ Akenes villous. Pappus composed of ten scales, produced into barbed bristles.

SUBORDER II. LIGULIFLORÆ.

TRIBE XII. **CICHORIACEÆ.** Heads homogamous, flowerets all ligulate, fertile. Anthers appendaged at tip, sagittate at base. Branches of style filiform, minutely papillose.

SUBTRIBE I. **SCOLYMEÆ.** Spiny plants. Receptacle chaffy, scales enclosing akenes. Pappus crown-like.

80. SCOLYMUS. ☉ ② Stems winged-spiny. Leaves and heads spiny. Flowers yellow

SUBTRIBE II. **CANTENANCHEÆ.** Receptacle honey-combed, bristly. Pappus of long chaff.

81. CATENANCHE. ☉ Leaves entire or sparingly dentate. Flowerets yellow.

SUBTRIBE III. **HYOSERIDEÆ.** Receptacle naked. Pappus chaffy or cup-like, never plumose, sometimes with a few bristles. Akenes truncate.

82. CICHORIUM. ☉ ♃ Flowerets blue or pink. Pappus short, in 2-3 rows of chaff and bristles.

83. HYOSERIS. ☉ Stemless herbs. Flowerets yellow. Pappus of short bristles and dilated pales.

84. HEDYPNOIS. ☉ Low herbs. Flowerets yellow. Pappus of outer akenes cup-like, of inner chaffy.

85. TOLPIS. ☉ ② Tall herbs. Flowerets yellow. Pappus of very short outer, and longer inner bristles, or altogether of long bristles.

SUBTRIBE IV. **LAPSANEÆ.** Receptacle naked. Akenes rounded or obtuse at tip, slightly margined.

86. LAPSANA. ☉ Tall, corymbose herbs, with lyrate to lanceolate leaves. Flowerets yellow.

SUBTRIBE V. **RHAGADIOLEÆ.** Receptacle naked. Akenes taperiug or beaked, rarely rounded at tip. Pappus crown-like, or of beards or bristles, rarely 0.

87. KŒLPINIA. ☉ Low. Leaves linear-filiform, entire. Akenes slender, curved, tipped with 7-9, recurved prickles.

88. RHAGADIOLUS. ☉ Tallish. Heads medium. Akenes awl-shaped, spreading-stellate. Pappus 0.

89. GARHADIOLUS. ☉ Low. Heads small. Akenes hook-like. Pappus a fringed crown.

90. ZACYNTHA. ☉ Low. Heads minute. Akenes of margin gibbous, with a very short beak. Pappus scabrous, caducous.

SUBTRIBE VI. **CREPIDEÆ.** Receptacle naked, chaffy, or bristly. Akenes slender, apex tapering or beaked.

91. RODIGIA. ⊙ Chaff linear-lanceolate. Akenes beaked. Pappus bristly or hairy.
92. PICRIS. ⊙ ② Receptacle naked. Akenes tapering or beaked, pappus plumose.
93. HAGIOSERIS. ⊙ Receptacle naked. Akenes of the margin crowned, of the disc with pappus of plumose scales in 1 row.
94. HELMINTHA. ⊙ Receptacle naked. Akenes with hair-like beaks; pappus plumose.
95. CREPIS. ⊙ ② ♃ Receptacle commonly naked. Akenes tapering or beaked. Pappus not plumose.
96. LAGOSERIS. ⊙ Receptacle bristly. Akenes columnar, pappus not plumose.
97. CYMBOSERIS. ⊙ Receptacle naked. Akenes with a hollow base. Pappus not plumose.

SUBTRIBE VII. **HIERACIEÆ.** Receptacle naked, bristly or chaffy, akenes contracted at base, truncate at tip.

98. HIERACIUM. ♃ Pappus white or reddish, brittle.
99. ANDRYALA. ⊙ Pappus plumose at base.

SUBTRIBE VIII. **HYPOCHÆRIDÆ.** Receptacle chaffy or naked. Akenes mostly beaked, wrinkled or scaly above.

100. HYPOCHÆRIS. ⊙ Receptacle chaffy. Outer akenes truncate or tapering, inner beaked.
101. LEONTODON. ⊙♃ Receptacle naked. Akenes tapering or beaked. Pappus plumose.
102. THRINCIA. ♃ Receptacle naked. Outer akenes tapering, ending in a fringed cup, inner beaked, with plumose pappus.
103. TARAXACUM. ♃ Receptacle naked. Akenes 4-angled, scaly, beaked. Pappus simple.

SUBTRIBE IX. **LACTUCEÆ.** Receptacle naked. Akenes rather contracted at base, tapering or beaked at tip, or tapering from base. Pappus copious, simple.

104. CHONDRILLA. ② Akenes 5-angled, commonly rather scaly, beaked.
105. LACTUCA. ⊙ ② ♃ ♄ Akenes compressed, beaked.
106. CEPHALORRHYNCHUS. ② Akenes terete; beak long, filiform.
107. PICRIDIUM. ⊙ ♃ Akenes not beaked, at least the outer 4-5-angled, wrinkled.
108. SONCHUS. ⊙ ② ♃ Akenes compressed, beakless.
109. ZOLLIKOFFERIA. ⊙ ② ♃ ♄ Outer akenes columnar, tapering, the inner white, smooth, truncate.

SUBTRIBE X. **SCORZONEREÆ.** Receptacle naked, or more or less hairy. Akenes with a hollow base, and a tapering or beaked tip. Pappus plumose.

110. TRAGOPOGON. ② ♃ Scales of involucre 5-16, about equal. Akenes beaked.
111. GEROPOGON ⊙ Scales of involucre 8. Akenes beaked, the outer tipped with 5 pales.
112. UROSPERMUM. ⊙ Scales of involucre 8-10, united below. Beak hollow and inflated at base.
113. SCORZONERA. ♃ Scales numerous (except *S. lanata*), unequal. Akenes beakless.

ORDER LVII. LOBELIACEAE. Juss. (LOBELIA FAMILY).

Herbs with alternate leaves, and scattered flowers; an irregular, monopetalous, 5-lobed, 2-lipped corolla; stamens 5, inserted on ovary, free from corolla, but united to one another by filaments and anthers, or by anthers only (syngenesious).—Calyx-tube adherent to the 2-3-celled, ∞-ovuled pod; placentæ central; style 1, stigma surrounded by an urn-shaped membrane or a hairy ring; embryo straight in copious albumen.

LAURENTIA, Mich. LAURENTIA.

Calyx 5-fid. Corolla tube entire, straight, limb somewhat 2-lipped, 5-fid. Filaments connate at middle and tip. Capsule 2-celled, 2-valved at tip—Dwarf herbs.

L. Michelii, D.C. ☉ .03 to .05, glabrous, tender; stems erect or ascending, simple or sparingly branched. Leaves short-petioled, obovate-oblong, .005 to. 006 long, crenate. Peduncles long, filiform; flowers .003 long, nodding; calyx lobes oblong, longer than tube, about half as long as pale-blue corolla.

Var. **integrifolia,** Post. Leaves obovate-oblong to ovate-oblong, *entire*—May—Inundated fields and wet places below Beit-Meri and Brummânah.

FIG. 234.



L. Michelii, DC. Var. integrifolia, Post.

ORDER LVIII. CAMPANULACEÆ, Juss. (BELL-FLOWER FAMILY).

Perennial, biennial, or annual herbs, with alternate leaves, and scattered flowers; calyx adherent to ovary; corolla bell-shaped, stellate, or rotate, valvate in bud; stamens free from corolla, as many as its lobes, and (in ours) distinct.—Calyx 3-10-lobed. Corolla (except Podanthum) gamopetalous, inserted on calyx, regular, its lobes alternate with those of calyx. Stamens alternate with corolla lobes. Ovary with 3-8, many-ovuled cells, and central placentæ; style 1; stigmas as many as cells of ovary. Fruit a variously dehiscent capsule.

* *Parts of flower all* 8-10 *in each row.*

1. MICHAUXIA. Flowers white, .1 broad, nodding. Tall stout herbs.

* * *Lobes of calyx and corolla and stamens* 5. *Stigmas* 3-5.

† *Style hairy.*

2. CAMPANULA. Corolla tubular to campanulate, rarely rotate, short-lobed.
3. PODANTHUM. Corolla 5-parted. Perennials or monocarpic.
4. SPECULARIA. Corolla rotate, deeply 5-cleft. Annuals.

† † *Style glabrous.*

5. TRACHELIUM. Corolla tubular. Perennial herbs with shrubby base.

1. MICHAUXIA, L'her. Michauxia.

Sinuses of 8-10-fid calyx furnished with reflexed appendages. Corolla 8-10 lobed. Stamens 8-10, free, filaments dilated at base. Stigmas 8-10, filiform, long-exserted. Capsule nodding, dehiscent by 8 valves at base—Tall, stout, monocarpic herbs, with showy, white flowers.

M. campanuloides, L'her. ② 1 to 1.5, strigose panicled or racemed above. Lower leaves lyrate or pinnatipartite, upper sessile, oblong, somewhat clasping, lobed or dentate. Flowers .1 broad, nearly sessile, nodding; calyx-lobes reflexed, much longer than top-shaped tube, growing in fruit—Rocky places; Phœnician coast and Lebanon to Amanus, Kurd Dagh, Akher Dagh, and northward.

2. CAMPANULA, L. Bell-Flower.

Calyx 5-cleft. Corolla 5-lobed or cleft, bell-shaped, stellate, rotate, or tubular. Stamens 5; filaments dilated at base. Styles clothed with viscid hairs; stigmas 3-5. Capsule 3-5-celled, opening by 3-5, lateral pores, at base, or middle, or below apex—Perennial, monocarpic, or annual herbs, with various habit; flowers showy, usually blue, sometimes white, rarely yellow.

Fig. 235.



Bell-shaped flower of Campanula.

* *Capsules opening by valves or pores near base.*

† *Capsules* 5-*celled. Stigmas* 5. *Calyx spurred.*

1 C. Ephesia.

† † *Capsules* 3-*celled. Stigmas* 3.

‡ *Perennials.*

¶ *Flowers more or less pedicelled. Calyx not spurred.*

§ *Flowers few, small, solitary or clustered. Low, decumbent plants, growing on rocks.*

2 C. dulcis, 3 euclasta, 4 Damascena, 5 trichopoda, 6 Cymbalaria.

§ § *Flowers numerous, large, racemed. Stems tall. Capsule nodding.*

7 C. Trachelium.

¶ ¶ *Flowers sessile, spiked or terminal. Calyx with inflated spurs.*

8 C. stricta,

‡ ‡ *Annuals. Flowers more or less peduncled.*

¶ *Calyx spurred.*

9 C. stellaris, 10 strigosa, 11 Hierosolymitana, 12 sulphurea, 13 camptoclada.

¶ ¶ *Calyx not spurred.*

14 C. Erinus.

* * *Capsule opening by valves or pores near apex or middle.*

† *Biennials.*

15 C. peregrina, 16 Rapunculus.

† † *Annuals.*

17 C. Phrygia, 18 Kotschyana, 19 ramosissima, 20 retrorsa, 21 Sidoniensis.

1. C. Ephesia, Boiss. ② .3 to .6, appressed-woolly, canescent. Root-leaves .15 to .25 long, petioled, lyrate, lobes oblong to ovate, obtusely crenate-dentate, decurrent and confluent ; stem-leaves sessile, oblong, acutely dentate. Flowers large, short-peduncled, 1-3 in a cluster ; calyx-lobes lanceolate-acuminate, spurs as long as tube ; corolla bell-shaped, once and a half as long as calyx — Spring — Ruins of Gerash (Tristram).

2. C. dulcis, Decaisn. ♃ .1 to .15, tufted, tomentellous, grey; stems brittle, leafy, 1-3 flowered. Leaves .01 to .015 long, sessile, ovate, obscurely sinuate-dentate, the upper clasping. Peduncles from upper axils, filiform ; flowers .01 long ; calyx-lobes narrowly lanceolate, appendages ovate, acute, longer than tube ; corolla white, hardly one-fourth longer than calyx — May and June — Rocky slopes Sinai ; 'Ain Ata (Tristram).

3. C. euclasta, Boiss. ♃ .05 to .15, velvety-canescent, stems *rather stout*, brittle. Leaves .003 to .01 long, more or less denticulate, lower obovate, obtuse, petioled, upper oblong, sessile, somewhat clasping. Flowers .01 to .02 long, nearly sessile, 3-4 clustered at apex or solitary ; calyx-lobes twice as long as tube — May to July — Fissures of rocks ; Râs Ba'albek to Damascus and el-Jebel-el-Abiaḍ, between Ḥama and Palmyra.

4. C. Damascena, Labill. ♃ .08 to .2, short-hispid ; stems *slender* but rigid, brittle. Leaves *denticulate*, elliptical-oblong to lenticular, the radical .02 long, petioled, the upper much smaller, nearly sessile. Flowers .01 long, more or less long-pedicelled ; calyx-lobes once and a half as long as tube — June and July — 'Aqûrah, in the grotto known as the Church of Peter and Paul ; Hermon and Antilebanon ; Breitân (Buqa'). Too near the last.

5. C. trichopoda, Boiss. ♃ .1 to .15, tomentellous-canescent ; stems *filiform*. Leaves *entire*, the radical often .02 long, rosetted, oblong-spathulate, petioled, the upper *round-ovate to lenticular*, minute, short-petioled. Peduncles capillary, sometimes .02 long, often with 1-2 bracts ; flowers .004 long ; calyx-lobes lanceolate, longer than tube — May to August — Fissures of rocks ; subalpine and alpine Lebanon. Perhaps an alpine variety of the last two.

6. C. Cymbalaria, Sibth. et Sm. ♃ .15 to .4, *glabrous* or *sparingly puberulent*, brittle, sparsely leaved. Leaves .01 to .02 broad, *ovate to reniform*, 5-11-*lobed or coarse toothed*, teeth more or less acute or acuminate, the lower leaves with long the upper with short petioles, the floral minute, sessile, oblong-lanceolate, acuminate, nearly entire. Branches 1-3-flowered ; pedicels filiform, at length recurved ; flowers .01 long ; calyx-lobes awl-shaped, thrice as long as spherical tube ; corolla blue, bell-shaped, — June to September — Fissures of rocks ; alpine and subalpine Lebanon.

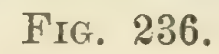
7. C Trachelium, L. ♃ 1 ; stem angled, simple, racemed, or panicled. Leaves scabrous-hairy, the radical reniform, long-petioled, the lower stem-leaves triangular-cordate, petioled, the upper sessile, oblong-lanceolate, all coarse-serrate. Flowers solitary, twin, or in triplets, on short, axillary peduncles ; calyx-lobes lanceolate, twice as long as tube ; corolla twice as long as calyx, .025 long, blue — August and September — Woods, Lebanon ; Amanus ; Akher Dagh.

Var. **Orientalis,** Boiss. More strigose. Clusters of flowers more sessile, flowers somewhat smaller—Same range as type.

8. C. stricta, L. ♃ .2 to .5, light green, scabrous with short bristles ; stems ascending from a woody root-stock, nearly simple, rigid. Leaves stiff, the lower ovate-oblong to oblong, .02 to .05 long, .005 to .01 broad, tapering to a petiole, entire or denticulate, the upper sessile, linear-lanceolate to lanceolate, sometimes clasping, Calyx-lobes triangular-lanceolate, spurs inflated, reticulate, covering the capsule ; corolla twice to thrice as long as calyx—July to October—

Var. **Libanotica,** Boiss. Leaves oblong. Corolla velvety or glabrous , .02 long—Lebanon ; Hermon ; Akher Dagh, and northward.

9. C. stellaris, Boiss. ⊙ .25 to .4, hispidulous, dichotomous, branching from base. Leaves entire or obsoletely denticulate, the lower ovate to oblong-spathulate, petioled, the upper sessile, oblong-lanceolate. Flowers in forks and terminal ; calyx *parted almost to base, stellate*, .01 broad in flower, .02 in fruit, with obtuse spurs ; corolla blue, flattened bell-shaped, twice as long as calyx ; capsule nodding, surrounded by rotate calyx-limb — Spring — Sandy and stony places ; coast and hill country ; Moab.


FIG. 236.



Fruiting calyx of C. stellaris.

C. dichotoma L., said by Tristram to be found in Moab, is probably C. Hierosolymitana, Boiss.

10. C. strigosa, Russ. ⊙ .2 to .5, *strigose ;* stem erect, dichotomous. Leaves sessile, entire or repand crenate, oblong to oblong-lanceolate. Flowers in forks and terminal, peduncled ; calyx bristly, with *ovate-lanceolate* lobes *abruptly awl-shaped at tip ;* spurs shorter than calyx-tube, *obtuse ;* corolla *twice and a half as* long as calyx, .025 to .03 long, bell-shaped, *deep blue ;* capsule nodding, *enclosed in inflated, connivent* lobes of calyx — Spring ; fields, common to 2000 m.

11. C. Hierosolymitana, Boiss. ⊙ .25, strigulose ; stem dichotomous. Leaves sessile, *oblong*, entire or obscurely crenate, rather acute. Flowers *all terminal*, 2-3 in a cluster, short-peduncled ; calyx-lobes lanceolate, acute, spurs ovate, obtuse, longer than tube ; corolla *pale* or deep violet, twice as long as calyx, *hirsute along nerves ;* capsule nodding — Rocks at Tombs of Kings ; Nablûs ; Melcha. Too near the last.

12. C. sulphurea, Boiss. ⊙ .2 to .5, appressed-strigulose ; stems 1-∞, branching from neck and above. Leaves sessile, oblong-linear. Flowers terminal, short-pedicelled ; calyx-lobes lanceolate, acute, strigose at margin and nerves, in fruit growing but little, connivent, spurs ovate-obtuse, not longer than tube ; corolla .02 long, glabrous, *yellow*, a little more than twice as long as calyx ; capsule nodding — May and June — Sands along coast.

13. C. camptoclada, Boiss. ⊙ .2 to .25, *hirsute with spreading hairs*, dichotomously branched from base. Leaves *ovate to ovate-oblong*, the lower tapering to a short petiole, the upper acute. Flowers *lateral and terminal, long-peduncled*, .013 to .015 long ; calyx-lobes oblong, tapering at tip, in fruit *inflated, enclosing capsule ;* spurs ovate, obtuse, growing in fruit ; corolla blue, twice as long as calyx ; capsule nodding — Spring — Appressed to rocks, at base of Hermon.

14. C. Erinus, L. ⊙ .1 to .25, hirsute. Stems dichotomous from base. Leaves obtusely serrate, obovate to elliptical, short-petioled to sessile, floral 3-5-lobed, generally opposite. Flowers sessile, .003 long ; calyx-lobes triangular-lanceolate, in fruit growing and *spreading-stellate ;* corolla a little longer than calyx-lobes, *pale bluish-white ;* capsule nodding, top-shaped — Spring — Grassy and rocky places ; coast and lower mountains.

15. C. peregrina, L. ② .5 to .8 or more, hispid ; stem erect, ending in a *dense, simple spike*, or a stiff panicle. Leaves tender, crenate, the lower obovate to oblong, *tapering to a winged petiole*, the middle oblong, the floral linear-lanceolate. Flowers axillary, sessile, .02 long, solitary or 2-3 in a cluster ; calyx-lobes lanceolate, twice as long as tube, and two-thirds as long as blue-corolla, *in fruit stellate-spreading* — July to September — Moist places ; coast and coast ranges to 1000 m.

16. C. Rapunculus, L. ② .5 to .8 or more, pubescent, asperulous, rarely glabrous ; root fusiform, fleshy ; stems erect, simple, wand-like, or stiff-panicled. The radical and lower leaves crenate, oblong, tapering into a long petiole, the others lanceolate to linear entire. Flowers solitary, .012 long, nearly sessile or peduncled, rarely ternate, with the middle flower long-peduncled ; calyx-lobes erect, twice to thrice as long as obconical tube, half to two-thirds as long as funnel-shaped, light-blue corolla — Spring — Woods and dry places ; common in plains and mountains to subalpine regions.

Var. **spiciformis,** Boiss. Pedicels shorter than calyx, or 0.

17. C. Phrygia, Boiss. ⊙ .1 to .3, sparingly pappillose-pubescent ; stem tender, simple or branching, flexuous. Leaves small, the lower and intermediate elliptical, obtusely crenate, subsessile, .005 long, .0025 broad, the upper minute, lanceolate to linear. Flower

terminal, .012 long, long-peduncled ; calyx *glabrous*, lobes lanceolate-subulate, 1-nerved, thrice as long as obconical tube ; corolla blue, obconical, lobes *half as long* as tube — May — Pines below Beit-Meri, (Lebanon).

18. C. Kotschyana, A. DC. ⊙ .2 to .35 ; stem scabridulous, slender, leafy below, flexuous, panicled. Leaves obovate to elliptical and oblong, remotely crenate, glabrous, floral minute. Branches of panicle filiform ; flowers .005 long, calyx-lobes once and a half to twice as long as *granular*, globular tube, a little more than half as long as blue corolla ; corolla-lobes *longer* than tube — June — Kurd Dagh.

19. C. ramosissima, Sibth. et Sm. ⊙ More or less beset with elongated pellucid papillæ ; stems simple or branching from neck, low, erect or ascending, divaricating. Lower leaves obovate, tapering to a short petiole, somewhat crenate, upper lanceolate, sessile, acute. Flowers terminal, solitary, on long, *thick* peduncles ; calyx-lobes lanceolate, 3-nerved, much longer than hemispherical-top-shaped, generally *white-hairy* tube ; corolla short-obconical, subrotate, shorter than calyx-lobes or as long, lobes twice as long as tube ; capsule hemispherical-top-shaped, strongly grooved, papillose, tipped by the spreading, enlarged lobes of the calyx — Spring — Open places ; Gilead (Tristram).

20. C. retrorsa, Labill. ⊙ .3 to 1, flaccid, trailing, scabrous with reflexed prickles ; stems strongly angled. Leaves entire, *the lower obovate-spathulate*, petioled, the upper *linear-lanceolate*, sessile. Calyx-lobes linear-lanceolate, 1-nerved, somewhat recurved, 3-4 times as long as *obconical* tube ; corolla blue, .02 to .03 broad, obconical-funnel-shaped, about as long as spreading calyx, lobes half as long as tube — Spring — Coast, and coast ranges to 1,000 m.

21. C. Sidoniensis, Boiss. et Bl. ⊙ .3 to .6, decumbent or ascending, tender, green ; stems sparingly retrorse-prickly at angles. Leaves scabrous or glabrous at margins, crenate, the lower *round to ovate*, petioled, the upper *oblong to lanceolate*, sessile. Calyx-lobes linear, 3-nerved, glabrous or ciliate, 3-5 times as long as *hemispherical* tube ; corolla blue, .01 to .02 broad, obconical-funnel-shaped, a little longer than calyx, lobes half as long as tube ; capsule *globular* — Spring — Hedges and old walls near Sidon, and probably elsewhere along the Phenician coast.

3. PODANTHUM, Boiss. Podanthum.

Calyx 5-cleft. Corolla 5-parted with linear, usually free lobes. Anthers free. Style hairy ; stigma trifid. Capsule 3-celled, opening by lateral pores at tip, middle, or base — Alpine or subalpine perennials or monocarpic herbs, with solitary or clustered flowers in spikes or racemes, differing from Campanula chiefly by its 5-parted corolla.

* *Bi-triennials or monocarpic plants.*

1. P. virgatum, Labill. ② .3 to .6, puberulent ; root-vertical ; stems numerous or single, *stout*, nearly naked, pyramidally branched. Leaves *radical or at lower part of stem*, scabridulous, *lanceolate, acuminate*, tapering to a petiole, entire or repand-dentate. Flowers .008 long, pale blue, remotely spiked, 1-3 in a cluster, sessile or short-pedicelled in the axil of minute, *triangular* bracts, — Summer —

Alpine and subalpine Lebanon to Amanus, and northward. A favorite plant with the goats, which seldom allow a specimen to arrive at maturity.

* * *Perennials.*

2. P. lanceolatum, Willd. ♃ .3 to .6, pubescent-scabrous, pale green; stems *slender*, erect or ascending, simple or branched below, ending in a loose spike. Leaves denticulate, the lower *oblong, tapering to a petiole*, the upper lanceolate, sessile. Flowers .006 long, 1-3 in sessile or short-peduncled clusters in axils of minute, *lanceolate* bracts — Summer — Subalpine Lebanon.

Var. **alpinum,** Boiss. .1 to .3, greyish. Spikes few-flowered. Bracts linear-lanceolate — Subalpine and alpine Lebanon and Hermon.

4. SPECULARIA, Heist. Venus' Looking Glass.

Calyx 5-parted into linear or awl-shaped lobes. Corolla rotate, 5-lobed. Style hairy. Capsule linear or oblong, prismatic; valves narrow, opening laterally beneath the apex — Annuals, with stems simple or branching from neck, and violet flowers.

1. S. Speculum, L. .2 to .5. Leaves sessile, oblong, the lowermost tapering at base, the uppermost half-clasping or heart-shaped at base. Flowers solitary, or 3-5 together in terminal corymbs; calyx-lobes linear-subulate, during flowering *nearly or quite as long as tube* and as corolla-lobes; corolla .01 to .012 long; capsule *constricted at tip* — Spring — Fields; common to subalpine regions.

Var. **Libanensis,** A. DC. Low. Capsules short, sometimes oblong — Sandy places.

2. S. pentagonia, L. ⊙ .3 to .5. Leaves sessile, the lower ovate, the upper *oblong-lanceolate to linear.* Flowers solitary, or 3-5 in terminal corymbs; calyx-lobes linear, ascending or spreading, during flowering a *little more than half as long as tube*, and shorter than corolla-lobes; corolla .015 to .02 long; capsule *not constricted* at tip — Spring — Grassy places; less common than last.

Fig. 237.



Fruiting calyx of S. falcata.

3. S. falcata, Ten. ⊙ .2 to .4. Lower leaves obovate, somewhat petioled, upper *ovate to ovate-oblong and lanceolate*, somewhat clasping. Flowers *solitary or twin in axils*, the lower remote, the upper approximated; calyx-lobes *reflexed-curved, a little shorter than tube, and longer than corolla-lobes;* corolla .006 to .008 long; capsule slightly, if at all, constricted at tip — Spring — Coast and middle mountain regions.

5. TRACHELIUM, L. Trachelium.

Calyx 5-fid. Corolla tubular, short-lobed or parted to middle. Stamens 5, free. Style glabrous, (in ours) twice as long as corolla. Capsule ovoid, 2-3-celled, opening by lateral pores at base — Perennial herbs with shrubby base, and small, white or blue, corymbed flowers.

1. T. tubulosum, Boiss. ♃ .1 to .25, pale green, hispidulous or glabrous ; stems slender, *ending in an umbel-like corymb.* Leaves glossy, sessile, oblong to elliptical, .02 to .035 long, .005 to .008 broad, *spreading*, acutish, sparingly denticulate. Pedicels capillary, 1-3 times as long as flower ; calyx glabrous, lobes subulate, longer than obconical tube ; corolla *white*, tubular, .006 long, with short, ovate-oblong lobes — October — Clefts of rocks ; from coast to 1,300 m.

2. T. Postii, Boiss. (in litt.) ♃ .15 to .25 ; stems *stout, pannous*, ending in a *capitate* corymb. Leaves *olive-green*, elliptical, .02 to .03 long, .015 to .02 broad, glossy and sparingly hispidulous at upper, *tomentellous at lower surface*, more or less irregularly serrate, obtuse, *reflexed, overlapping.* Pedicels slender, longer than flower ; calyx *hispidulous*, lobes linear-lanceolate, twice to thrice as long as turbinate tube ; corolla tubular-funnel-shaped, *blue*, .008 long, lobes half as long as tube, linear — August — Hamah. Near *T. Rumelicum, Hampe*, but distinguished by pannous indument, broad leaves, and long pedicels.

ORDER LIX. **ERICACEÆ.** Lindl. (HEATH FAMILY).

Shrubs or small trees, with calyx free from ovary as in Corolliforæ. Stamens not adherent to corolla — Calyx 4-5-lobed or parted, free from ovary, persistent. Corolla gamopetalous, 4-5-lobed. Stamens 4-5, alternate with lobes of corolla, or 8-10, hypogynous, free ; anthers 2-celled, 2-horned, or with 2, terminal pores. Ovary free, 4-5-celled ; seeds 5 or more in a cell ; placentæ central. Style 1, stigma undivided or 3-lobed. Fruit a berry or capsule.

* *Fruit an indehiscent berry. Corolla small, ovoid-urceolate, deciduous.*

1. ARBUTUS. Shrubs or small trees with reddish bark and leathery leaves.

* * *Fruit capsular, loculicidal. Corolla ovoid-urceolate, marcescent.*

2. PENTAPERA. Lobes of calyx and corolla 5. Stamens 10.
3. ERICA. Shrubs with minute leaves. Lobes of calyx and corolla 4. Stamens 8.

* * * *Fruit capsular, septicidal. Corolla large, showy, deciduous.*

4. RHODODENDRON. Leaves leathery. Lobes of calyx and corolla 5. Stamens 5-10.

1. ARBUTUS, L. ARBUTUS. *Qoṭlib.*

Calyx 5-lobed. Corolla ovate or globular-urceolate, 5-toothed. Stamens 10, inserted on hypogynous disk. Anthers with 2 pores at tip. Berry with five, 4-5-seeded cells — Tall shrubs or small trees, with persistent, leathery leaves, and small, panicled racemes of white, waxy flowers, resembling Lilies of the Valley.

FIG. 238.

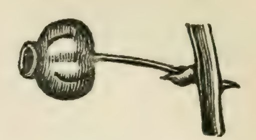


Fruit of A Unedo.

1. A. Unedo, L. ♄ 1 to 3 ; branches straight, with *rough, rusty* bark. Leaves obovate to elliptical-oblong, .03 to .09 long, *serrate*, acutish or obtuse. Racemes somewhat panicled, *nodding, glabrous ;* berries few, .01 to .016 in diameter, *rough-warty, scarlet, edible* — October to early spring — Palestine ; Lebanon below Beit-Meri.

2. A. Andrachne, L. ♄ *Qotlib. Qaiqob.* 3 to 5 ; branches tortuous, with *smooth, red* bark, peeling off in sheets, and leaving a reddish surface of inner bark. Leaves elliptical, .1 .15 long, *entire.* Panicle somewhat leafy, *erect, glandular-pubescent ;* berries numerous, .006 in diameter, *orange-colored,* somewhat tubercled, *not edible* — February to April — Woods and copses ; coast and lower mountain chains.

FIG. 239.



Flower of A. Andrachne.

Var. **serratula,** Post. Leaves obtusely serrulate — Woods of Moab and Gilead.

2. PENTAPERA, Kl. L. PENTAPERA.

Sepals 5. Corolla ovate-urceolate, 5-lobed. Stamens 10, free, anthers muticous. Ovary 5-celled, cells ∞-ovuled — A heather-like shrub, distinguished by the quinate parts of the flower.

P. Sicula, Guss. ♄ Branches erect, the younger pubescent. Leaves in fours, velvety, linear-terete, somewhat flattened, grooved beneath, obtuse. Flowers 4-5, terminal, somewhat umbelled, pedicels 3-bracted, longer than calyx ; sepals lanceolate, obtuse, tomentellous, shorter than pink corolla ; ovary white-woolly — May and June.

Var. **Libanotica,** Barb. Branches longer, more slender, the younger nearly glabrous. Flowers glabrous, glossy, with longer pedicels, more slender — Between Billaas and Afka, 1100 m.

3. ERICA, L. HEATHER.

Calyx-lobes 4. Corolla urceolate, 4-lobed. Stamens 8, free. Ovary 4-celled, cells ∞-ovuled ; capsule with 4, loculicidal valves — Low shrubs, with racemed, pink, sweet-scented flowers.

E. verticillata, Forsk. ♄ .3 to 1.5 ; branches white, glabrous. Leaves in whorls of 3, linear, obtuse, .005 long, grooved beneath. Flowers 3-5, in lateral clusters, forming long racemes ; corolla .002 to .003 long, short-lobed, thrice to four times as long as calyx ; anthers dark purple, exserted, not appendaged, cells free to base — August to October — Sandstone and chalky rocks ; western slopes of Lebanon, between 100 and 1000 m. ; Nusairy Mountains to Cassius, Amanus, and northward.

4. RHODODENDRON, L. RHODODENDRON.

Calyx more or less plainly 5-toothed or parted. Corolla funnel-shaped, campanulate, with irregular 5-fid limb. Stamens (in ours) 10, declined ; anthers with 2 pores at apex. Capsule leathery, 5-celled. Seeds numerous, scobiform, with a loose testa.

R. Ponticum, L. ♄ 1 to 2. Leaves leathery, evergreen, glabrous, oblong, acute, with revolute margins, short-petioled, paler beneath. Flowering bud strobiliform, ovate, with ovate, ciliate bracts ; corymb many-flowered on a short axis ; peduncles glabrous ; calyx disk-like with short, triangular teeth ; corolla .05 long, with oblong lobes

half its length, lower and inner aspect sparingly papillose ; ovary glabrous — May —

Var. **brachycarpum,** Boiss. Leaves smaller, .08 to .1 long, *oblong.* Capsules shorter — Sandstone ; middle and subalpine zones of Lebanon, 1000 to 2000 m.

DIVISION IV. COROLLIFLORÆ.

Sepals more or less united. Petals usually united, separate from calyx at base. Stamens usually adnate to corolla. Ovary usually free.

ORDER LX. PLUMBAGINEÆ, Endl. (LEADWORT FAMILY).

Herbs or shrubs, with regular, perfect, 5-*merous flowers, a gamosepalous, tubular or funnel-shaped calyx, with plicate, scarious limb, (in Plumbago herbaceous) and five stamens opposite the corolla-lobes or clawed petals, and a free, sessile,* 1-*celled ovary, with one ovule pendulous by a cord arising from the base of the cell* — Styles 5, free, or united at base, to middle, or to apex ; stigmas filiform or capitate. Fruit a utricle, included in calyx, membranous, indehiscent, or dehiscent by a lid or irregular valves. Seeds inverted, albuminous — An order standing apart, allied by some of its characteristics to Primulaceæ, and by others to Plantaginaceæ.

* *Styles free from base, or above. Fruit rupturing at base or opening by a lid.*

† *Erinaceous, subalpine or alpine shrubs, with awl-shaped or needle-like, prickly leaves.*

1. ACANTHOLIMON. Calyx 5-nerved. Styles glabrous. Stigmas capitate.

‡ ‡ *Shrubs or herbs, not erinaceous, and, for the most part, not high mountain plants. Petals free almost to base, or united to limb.*

‡ *Inflorescence racemed-spiked.*

2. GONIOLIMON. Calyx 5-nerved. Styles papillose. Stigmas capitate.

3. STATICE. Calyx 5-nerved. Styles glabrous. Stigmas filiform.

4. LIMONIASTRUM. Calyx nerveless. Styles glabrous. Stigmas filiform. Corolla gamopetalous to throat.

‡ ‡ *Inflorescence capitate-globular.*

5. ARMERIA. Calyx 10-nerved, spurred at base. Styles bearded below. Stigmas filiform.

* * Styles connate to tip. Fruit dehiscent by valves at base.

6. PLUMBAGO. Calyx herbaceous. Corolla hypocrateriform, with 5-parted limb.

1. ACANTHOLIMON, Boiss. ACANTHOLIMON.

Calyx funnel-shaped, with slender tube, and scarious, 5-nerved, 5-10-lobed limb. Petals 5, connate at base, long-clawed. Filaments 5, free, glabrous. Ovary linear-cylindrical, tapering into 5, glabrous styles coherent at base. Stigmas capitate. Utricle crustaceous-membranous, indehiscent, or splitting at angles — Erinaceous, high mountain shrubs, with needle-like or subulate leaves, and (in ours) spike-like racemes of showy flowers, (in ours) arranged in 1-flowered and 3-bracted spikelets.

* *Calyx-limb reddish or purple.*

1. A. laxiflorum, Boiss. ♃ Branches .04 to .08 long, black, naked below, ending in a rosette of fleshy, 3-angled, cuspidate leaves, .02 to .03 long. Scapes longer than leaves, ending in a spike .06 to .15 long; bracts scarious-margined, *with a long, excurrent, reddish midrib,* the outer one-third shorter than the inner; calyx-tube hairy, twice as long as obsoletely 5-lobed limb — June and July — Shingly places; Amanus.

Var. **condensatum,** Post. Branches shorter, more leafy below. Spike shorter — Amanus.

** *Calyx-limb white or pink.*

2. A. Baltanense, Boiss. et Haussk. ♃ Branches .1 to .15 long, densely beset with .04 to .07 long, needle-like leaves, *the lower deflexed.* Scapes .05 to .1 long, ending in a flexuous, 2-ranked spike, .1 to .15 long; the outer bract *considerably longer* than the less acuminate, mucronate, inner one, *and ending in a somewhat recurved cusp;* calyx-tube sparingly hairy, twice as long as crenately lobed limb—June and July — Above Hassan Beyley, (Amanus).

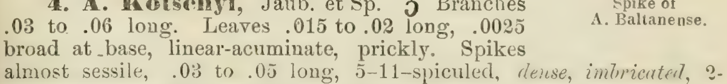
Fig. 240.



Spike of A. Baltanense.

3. A. Armenum, Boiss. et Huet. ♃ Branches .05 to .08 long. Leaves .02 to .03 long, needle-like from a broader base. Scapes *about as long as leaves,* ending in a 1–2–ranked, more or less flexuous spike, .05 to .1 long, *with joints shorter than bracts;* bracts *nearly equal,* the lower acuminate-spiny, the upper obtuse, mucronate; calyx-tube hirsute, about as long as limb — Summer.

Var. **Balansæ,** Boiss. Leaves somewhat narrower, often longer. Outer bract rusty-colored within the scarious margin — Alpine and subalpine Hermon, Antilebanon, Akher Dagh, and northward.



4. A. Kotschyi, Jaub. et Sp. ♃ Branches .03 to .06 long. Leaves .015 to .02 long, .0025 broad at base, linear-acuminate, prickly. Spikes almost sessile, .03 to .05 long, 5–11–spiculed, *dense, imbricated,* 2-ranked, *flattened, straight;* bracts nearly equal, the outer cuspidate, the inner keeled, mucronate; calyx-tube hirtulous, a little longer than crenate limb — Summer — Alpine Akher Dagh, and northward.

5. A. Libanoticum, Boiss. ♃ Branches .02 to .05 long, densely beset below with old, blackened leaves. Leaves .01 to .02 long, cuspidate. Spike almost sessile, .02 to .03 long, 3–7–spiculed, loose; bracts nearly equal, keeled, the outer tapering-cuspidate, the inner abruptly-cuspidate; calyx-tube hispidulous, about half as long as obsoletely 5-lobed limb — June to October — Alpine and subalpine Lebanon and Antilebanon.

Var. **ulicinum,** Boiss. Leaves .01 long. Spikes .015 to .02 long — Same range as type.

2. GONIOLIMON, Boiss. Goniolimon.

Calyx funnel-shaped, with scarious, 5-nerved, 5-lobed limb. Petals 5, connate at base, but the margins of the claws touching each other, and forming a tube. Filaments somewhat connected by their glandular bases. Styles 5, free, papillose. Stigmas capitate. Utricle membranous, opening by a lid — Herbs with angled or winged scapes and branches.

G. collinum, Griseb. ♃ 2.5 to .3, glaucescent. Leaves oblong to lanceolate, aristate-mucronate, long-petioled. Scape branching from near base, paniculate-corymbose, branches spreading-recurved; spikelets 1-flowered, clustered in short, imbricated spikes; bracts green, leathery, keeled, somewhat recurved, the outer membranous-margined, 3-toothed, the middle tooth longer; calyx-tube glabrous, longer than limb — Spring — Between Tripoli and Ḥamah.

3. STATICE, L. Sea-Lavender.

Calyx obconical-tubular or funnel shaped, with scarious, 5-nerved, 5-10-lobed limb, or 5 sepals. Corolla polypetalous, or united at base, or as far as limb. Stamens adnate at base or as far as middle of petals. Styles glabrous, free or short-connate at base. Stigmas filiform-cylindrical, glandular over whole surface. Utricle indurated above, membranous below, opening by a lid, or rupturing irregularly near base — Perennial or annual herbs or shrubs, with flowers arranged in 3-bracted spikelets.

* *Petals free or only connate at base.*

† *Floral branches 2-3-auricled, obpyramidal. Calyx-insertion erect, limb broad, plaited. Leaves sinuate to pinnatifid, rosetted. Annuals or perennials.*

1. S. sinuata, L. ♃ .2 to .5, *hispid-scabrous.* Scapes crisply 3-5-winged, the wings ending at nodes *in ternate-whorled, linear, tapering, leaf-like appendages;* wings of floral branches .001 to .002 broad; lower aspect of axis covered with linear, ciliate-pectinate scales; calyx-limb *blue,* truncate, crenulate; corolla cream-colored — March to June — Along the coast; east of Jordan (Tristram).

2. S. Thouini, Viv. ⊙ .2 to .4, *glabrous.* Scapes more or less 3-winged, *one of the wings ending* at the nodes in a *short, blunt, oblong appendage;* wings of floral branches .002 to .004 broad, reticulate; axis nearly naked; calyx-limb *white, cleft to middle into 5, triangular lobes, with bristle in sinus;* corolla yellow — Spring — Jordan Valley and its flanks to the Mediterranean sea-level; south of Gaza; Arabia Petræa.

Fig. 241.



Cyme of S. Thouini.

† † *Branches terete or angled. Calyx-insertion oblique. Perennial herbs.*

3. S. Limonium, L. ♃ .3 to .8, glabrous-glaucescent. Leaves oblong to oblong-lanceolate, tapering to a petiole, .05 to .2 long. Spikes one-sided, dense or lax, often scorpioid; spikelets 2–3–flowered; bracts herbaceous,

scarious-margined, the lower one-third the length of the upper; flowers .003 long; calyx-tube hairy, longer than triangular-lobed limb — June to November — Coast of Mediterranean and Dead Sea.

4. S. Sieberi, Boiss. ♃ .2 to .5, glabrous-glaucescent. Leaves *obovate-spathulate*, long-petioled, .02 to .04 long. Lower branches sterile, upper dichotomous. Spikelets 1-2-flowered, *straight*, forming lax, one-sided spikes; bracts brown, coriaceous with rusty, scarious margin, the upper thrice as long as the lower; calyx-tube hirtulous, *much longer than limb* — June to November — Rocks along seashore.

5. S. virgata, Boiss. ♃ .2 to .3, glabrous. Leaves *oblong-to lanceolate-spathulate*, tapering to a long petiole, .02 to .03 long. Lower branches sterile, upper dichotomous. Spikelets 2-4-flowered, usually *incurved*, forming lax, one-sided spikes; bracts coriaceous, rusty, scarious-margined, the upper four times as long as the lower; calyx-tube hairy, *twice as long as limb* — Summer — Coast.

6. S. rorida, S. et Sm. ♃ .2 to .4, *tubercular-roughened.* Leaves oblong to oblong-spathulate, tapering to a long petiole, .01 to .02 long. Lower branches sterile, upper ending in one-sided, .01 long spikes; spikelets 1-3-flowered, nearly straight; lower bracts membranous, one-third as long as upper, coriaceous; calyx-tube hirtulous, with short limb — Late summer and autumn — Phœnician coast.

7. S. pruinosa, L. ♃ *Aryal. Milleih.* .4 to .5, furfuraceous. Leaves *soon disappearing*, obovate-spathulate to *obovate-cordate*, tapering into a petiole. Scapes panicled with brittle, *flexuous-angled* branches, beset at nodes with tawny, triangular scales; lower branches sterile, forked, jointed; spikelets 1-flowered, arranged in scorpioid, .01 to .015 long spikes; lower bracts ovate, acutish, one-fourth as long as the inner, obtuse ones; calyx-tube obconical, glabrous, as long as obtusely 5-lobed limb — Spring — Valleys and plains around Dead Sea, and northward; coast.

8. S. Palmyrensis, Post. Sp. nov. ♄ (Plantæ Postian. Fasc. III. p. 16). .3 to .5, glabrous-glaucescent, *depressed-punctate;* branches erect, densely leafy below. Leaves fleshy, *linear-spathulate*, .01 to .035 long, .001 to .002 broad at tip, semicylindrical, obtuse, sheaths broad-ovate, acutish, not auricled. Flowering branches panicled; spikelets 1-3-flowered, spikes .008 to .01 long, 1-2-ranked; bracts reddish, white-margined, not keeled, obtuse; calyx-tube hairy at ribs, limb half as long as tube, lobes ovate, scarious —November — Salt marshes; Palmyra, and eastward.

* * *Corolla gamopetalous. Spikelets densely spiked. Annuals.*

9. S. spicata, Willd. ⊙ .2 to .8, sparingly papillose-pubescent or glabrescent. Leaves oblanceolate, petioled, entire or runcinate-pinnatifid. Scapes a little longer than leaves; spikes 1-∞, sessile, *cylindrical*, the lower distant, the upper crowded; spikelets 2-4-flowered; bracts brownish, papillose, the lower *oblong-spathulate, stipitate, incurved, awned*, the upper broader, shorter, truncate at apex; calyx-tube glandular-hispid below, limb with 5, triangular, aristate lobes — Spring — Salty places along coast, in Jordan Valley, around Dead Sea, and in Merj of Damascus, and eastward.

4. LIMONIASTRUM, Mœnch. LIMONIASTRUM.

Calyx tubular, membranous, ribless, with a minute, acutely 5-lobed limb. Corolla funnel-shaped, gamopetalous to throat, with a long, slender tube, and obovate lobes. Filaments adnate to throat of corolla. Styles connate to middle, glabrous. Stigmas filiform-cylindrical. Utricle membranous, indehiscent. Albumen thin—Shrublets with fleshy leaves, and loosely spiked, 3-bracted spikelets, closely appressed to side of rachis.

L. monopetalum, L. ♄ *Zeiteh.* Glaucous, covered with calcareous scales, densely branched, and very leafy. Leaves fleshy, flat, oblong to lanceolate-spathulate, obtuse, tapering to a petiole sheathing the stem at base. Spikes stiff, short-panicled; rachis flexuous, jointed, very brittle; spikelets 2-flowered; lower bract wine-glass-shaped, obliquely truncate, sheathing the spikelet and rachis; intermediate bract linear, triquetrous, subulate at tip; innermost longer, leathery, enclosing the flowers; calyx-tube long, slender, membranous, teeth minute, acute; corolla pink, limb nearly rotate — Coast of Palestine.

5. ARMERIA, Willd. THRIFT.

Calyx funnel-shaped with a 10-ribbed tube, obliquely inserted on the somewhat dilated pedicel, spurred at base. Petals 5, coherent only at base. Filaments nearly free. Styles 5, connate at base, bearded along their lower third. Stigmas filiform-cylindrical, glandular. Utricle membranous, nearly indehiscent, 5-angled above, with 5 gibbi at apex, and irregularly rupturing at base — Perennial herbs, with linear leaves and 1-bracted spikelets, in a hemispherical, terminal head.

A. Majellensis, Boiss. ♃ Tufted at base. Leaves of two forms, the outer spreading, broad-linear, 3-nerved, the inner narrow-linear, much longer. Scapes .4 to .5; heads .01 to .02 broad; involucre-leaves pale brown, ovate, cuspidate to muticous; spikelets sessile; calyx-lobes aristate — June to September.—

Var. **leucantha,** Boiss. Corolla white — Alpine and subalpine Lebanon and Antilebanon.

6. PLUMBAGO, L. LEADWORT.

Calyx gamosepalous, herbaceous, tubular, stipitate-glandular. Corolla salver-shaped, with 5-parted limb. Filaments free, dilated at base into concave scales. Ovary oblong, style filiform. Stigmas 5, filiform, glandular within. Utricle membranous, rupturing around base, and at length splitting by valves from base to middle — Perennial, shrubby plants, with (in ours) racemed, nearly sessile, 3-bracted, lilac or pink flowers.

P. Europæa, L. ♃ .5 to 1.5, with angled branches. Leaves obovate to oblong, lanceolate, and linear, the upper auricled-clasping. Racemes at first capitate, dense, at length elongated, loose — Throughout the year — Common throughout.

ORDER LXI. **PRIMULACEÆ.** Ven. (PRIMROSE FAMILY).

Herbs with opposite or alternate, simple leaves, and regular, perfect flowers, the stamens as many as the lobes of the monopetalous (or nearly polypetalous) corolla, and inserted opposite them on the tube (in Samolus twice as many as the lobes of the corolla, the outer five sterile, inserted in the sinuses), and a free, 1-celled ovary, with a free, central, basilar placenta, several- to many-seeded. Calyx free from ovary, or in Samolus partly coherent, 5- (rarely 4-) lobed. Corolla 5- (rarely 4-) lobed. Style and stigma 1. Seeds generally peltate.

* *Capsule superior, dehiscent above or down its whole length by valves.*

† *Flowers terminal. Leaves rosetted at base.*

1. PRIMULA. ♃ Roots fibrous. Alpine and subalpine plants with showy flowers on scapes.

2. ANDROSACE. ♃ ② ① Roots fibrous. Dwarf plants, with small, short-pedicelled, umbelled flowers.

3. CYCLAMEN. ♃ Roots tuberous. Corolla with short tube and reflexed limb.

† † *Flowers axillary. Leaves scattered.*

4. LYSIMACHIA. ⊙ Tall, stout plants, with racemed or panicled flowers.

5. ASTEROLINUM. ⊙ Dwarf, tender plants, with filiform branches and solitary, minute flowers.

* * *Capsule superior, opening by a lid.*

6. ANAGALLIS. ⊙ Diffuse or ascending plants, with axillary, blue or reddish flowers.

* * * *Capsule half-superior, opening by valves.*

7. SAMOLUS. ♃ Erect herbs, with small, white flowers, in terminal racemes or panicles.

1. PRIMULA, L. PRIMROSE. COWSLIP.

Calyx angled, 5-cleft. Corolla salver-shaped, with dilated throat. Pod many-seeded, dehiscent at apex by 5 valves—Subalpine and alpine herbs, with showy flowers.

P. acaulis, Jacq. ♃ Leaves obovate-oblong, tapering to a petiole, wrinkled, dentate, hirsute at lower surface along veins or everywhere. Scapes .15 to .2, as long as leaves or shorter, 1-flowered, numerous. Corolla yellow, pink, or white, limb .02 to .025 broad, lobes obcordate — February and March — 1000 to 2000 m., in Galilee, Lebanon, Nusairy Mountains, Cassius, Amanus, and northward.

2. ANDROSACE, L. ANDROSACE.

Calyx 5-lobed. Corolla salver-shaped, with short tube, the throat narrowed by a small crown or folds. Capsule usually few-seeded, 5-valved almost to base — Low, perennial, biennial, or annual herbs, with umbelled flowers.

1. A. villosa, L. ♃ .02 to .04, *villous, tufted;* stems recurved, brittle. Leaves *lenticular to oblong, or oblanceolate,* .002 to .004 long, entire. Scapes before flowering as long as or longer than few-flowered

umbels; pedicels very short; flowers minute, white, .004 long, tube of corolla a little longer than calyx; fruiting calyx .002 to .003 broad, lobes connivent — Summer — Highest peaks of Lebanon above Cedars, and Rijâl-el-'Asherah.

2. A. multiscapa, Duby. ② .03 to .04, hirsute with short, branching hairs; root slender, vertical. Leaves densely rosetted, .01 to .015 long, *linear-lingulate*, obtuse, entire, or minutely 1-2-toothed above. Scapes numerous, twice as long as leaves; umbels 2-5-flowered; pedicels nearly as long as calyx; flowers white or flesh-colored; fruiting calyx .005 broad, lobes slightly spreading — Summer — Alpine summits of Lebanon.

3. A. maxima, L. ⊙ .05 to .15, sparingly papillose. Leaves .015 to .04 long, rhomboid-ovate to lenticular and oblong-lanceolate, serrulate above. Scape much longer than 3-10-flowered umbels; pedicels as long as or longer than hirsute, accrescent calyx; flowers reddish-white; fruiting calyx .013 broad, lobes somewhat spreading — Spring — Jerusalem to Damascus, Antilebanon, Cœlesyria, Aintab, and northward.

Fig. 242.



Upper leaves and umbels of immature fruiting calyces of A. maxima.

3. CYCLAMEN, L. Cyclamen. *Duweik-el-Jebel. Bakhûr Mariam.*

Calyx campanulate, 5-parted. Corolla-tube short, limb 5-parted, reflexed. Stamens 5, inserted at bottom of tube, anthers included, sessile, cuspidate. Capsule somewhat fleshy, globular, at length 5-valved, closely surrounded by the connivent calyx-lobes — Perennial, herbaceous plants, with turnip-shaped, tuberous roots, from the upper aspect of which springs a short, underground stem, which bears the peduncles and petioles — *Germination monocotyledonous.*

1. C. Coum, Mill. ♃ Leaves round or round-kidney-shaped, cordate at base, entire or crenate-repand. Peduncles at length *spirally-coiled;* calyx-lobes oblong-lanceolate to lanceolate, acute; corolla .015 to .002 broad, deep pink, lobes obovate, obtuse, *twice as long as tube* — January to June — Alpine and subalpine regions of Lebanon, Antilebanon, Amanus, and northward.

2. C. latifolium, S. et S. ♃ *Duweik-el-Jebel.* Leaves large, ovate, somewhat acute, cordate at base, unequally crenate-denticulate. Peduncles *not coiled;* calyx-lobes ovate, somewhat acute; corolla .025 to .03 broad, white or light pink, lobes linear-elliptical, *five to six times as long as tube* — January to May — Rocky places everywhere.

4. LYSIMACHIA, L. Loosestrife.

Calyx 5-cleft, or -parted. Corolla 5-parted, campanulate or rotate. Stamens 5, free or monadelphous at base. Capsules 5-valved. Seeds smooth, numerous — Perennial or (ours) annual herbs.

1. L. dubia, Ait. ⊙ .4 to 1; stem leafy, ending in a spike-like raceme or panicle. Leaves alternate, oblong-lanceolate, tapering at base, the lower short-petioled. Pedicels as long as or a little shorter than calyx; calyx-lobes, elliptical-lanceolate; corolla whitish-red, nearly twice as long as calyx, with obovate, erect lobes, and included stamens — May to August — Coast; Ghor-es-Sâfieh; Hûleh; Lebanon; Antioch; Kurd Dagh; Akher Dagh.

5. ASTEROLINUM, Link. et Hoffm. ASTEROLINUM.

Calyx 5-parted. Corolla one-third to one-fourth as long as calyx, with short tube, and short, 5-parted, campanulate limb. Stamens 5, with filaments longer than corolla. Capsules enclosed in persistent calyx, 5-valved, 2-3-seeded. Seeds roughened at back, convex at face, umbilicate — Dwarf annuals.

A. Linum-stellatum, L. ⊙ .1, stems filiform, simple or branching from base. Leaves .005 to .01 long, sessile, linear-lanceolate, opposite. Pedicels solitary, axillary, shorter than leaves, at length nodding; calyx-lobes stellate, linear-lanceolate, aristate, much longer than capsule — Spring — Coast to subalpine regions.

6. ANAGALLIS, L. PIMPERNEL.

Calyx 5-parted. Corolla rotate, almost 5-petalous, longer than the calyx. Stamens 5, filaments bearded. Capsule membranous, circumscissile, many-seeded. Seeds angular — Spreading herbs, with opposite or whorled leaves, and solitary flowers on axillary peduncles.

1. A. arvensis, L. ⊙ Pimpernel. Poor man's weather-glass. Glabrous. Leaves sessile, ovate to triangular-ovate, black-dotted at lower surface. Peduncles a little longer than leaves, petals obovate, a little longer than acuminate calyx-lobes, fringed with minute, glandular-ciliate teeth — October to June — Fields and roadsides.

Var. **phœnicea,** Boiss. Corolla light-red.

Var. **cærulea,** Boiss. Corolla blue.

Var. **latifolia,** Post. Stems compressed. Leaves broad. All the parts larger than in type — Fertile, moist soil. (*A. latifolia, L.*)

FIG. 243.



a. Branch of A. arvensis.
b. Capsule of same, opened to show seeds.

7. SAMOLUS, L. WATER PIMPERNEL. BROOK-WEED.

Lower half of calyx coherent with ovary. Corolla perigynous, with short tube, and 5, spreading lobes. Fertile stamens 5, inserted on tube of corolla, opposite its lobes, sterile 5, in clefts. Capsule half 5-valved — Perennial herbs.

S. Valerandi, L. ♃ *'Arîdeh. Şâbûn-'Arab. Semniâ-Setein.* .3 to .8, glaucescent; stem simple or paniculate. Leaves obovate-spathulate, the lower tapering to a petiole. Racemes leafless; pedicels setaceous, ascending, incurved at bracteolate joint above middle; flowers .002 to .003 long; calyx-teeth erect, triangular; corolla white, a little longer than calyx — Summer — Ditches, pools, and moist places; common throughout.

ORDER LXII. STYRACACEÆ, D. C. (STYRAX FAMILY).

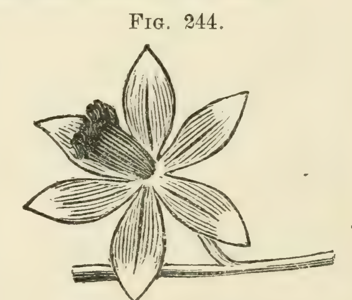
Shrubs or small trees, with simple, entire, alternate, exstipulate leaves, and perfect, regular flowers, the calyx adnate to 3-5-celled ovary; corolla perigynous, 5-7-parted, lobes alternating with those of calyx; stamens monadelphous or polyadelphous at base; style 1, stigma capitate; fruit drupe-like, green, 1-celled by abortion, 1-seeded — Stamens as many as corolla-lobes, or double their number, or more, inserted at base of corolla — A family represented with us by one genus.

STYRAX, Tourn. STYRAX. *Ḥauz.*

Calyx cup-shaped, repand-5-dentate. Corolla tube short, with 5-7 lobes, twisted to the cleft in æstivation, or nearly valvular. Stamens 6-16. Fruit ovate, leathery, with persistent calyx adnate to its base, and 3 valves dehiscent from base or apex. Seed large, ovate-globular. —Small trees, with white flowers resembling those of the orange.

S. officinale, L. ♄ Styrax. *Ḥauz. Abhar. Libnah.* 3 to 6, young branches woolly. Leaves petioled, ovate, to round-ovate, glabrescent at upper, tomentellous at lower surface. Cymes few-flowered; corolla .02 to .04 broad, 3-5-times as long as truncate calyx; stamens 12 or less; fruit tomentellous, .02 in diameter — Summer— Common in thickets and mountains to subalpine regions throughout. A very showy shrub in the season of flowers. The officinal Storax is the inspissated juice of the bark.

FIG. 244.



Flower of Styrax officinale.

ORDER LXIII. JASMINEÆ, R. Br. (JESSAMINE FAMILY).

Flowers regular, perfect. Calyx persistent, dentate or lobed. Corolla hypogynous, salver-shaped, with 5-8 lobes, spirally convolute in bud. Stamens 2, inserted on tube, enclosed within it. Ovary destitute of disk, 2-celled, 2-lobed at apex, ovules 1-2 in a cell, erect. Style simple, stigma 2-lobed. Fruit a double berry, or separable into 2 capsules. Albumen little or 0, embryo straight.

JASMINUM, Tourn. Jessamine. *Yasemîn.*

Characters as above. Berries with twin, 1-seeded cells — Shrubs, bushy or climbing.

J. fruticans, L. ♄ .5 to 1.5, not climbing, with somewhat angled branches. Leaves alternate, *tri-foliolate* or simple, somewhat leathery, leaflets oblong-spathulate. Flowers 2-4 at end of branches, .015 long, yellow; calyx-teeth awl-shaped, one-third to one-fourth as long as corolla — April to June — Common in lower and middle zone of mountains.

J. officinale, L., a climbing shrub, with odd pinnate leaves composed of 3½ pairs of leaflets, and the well known, white, fragrant flowers, is everywhere cultivated, but not spontaneous.

Order LXIV. **OLEACEÆ,** Lindl. (Olive Family).

Shrubs or trees, with opposite, simple, or pinnate leaves, a 4-*cleft calyx (sometimes* 0*), and a* 4-6-*cleft or nearly* 4-6-*petalous corolla, valvate in bud, sometimes apetalous. Stamens* 2, *rarely* 3—Flowers hermaphrodite, regular. Petals in pairs, connected by a filament. Disk 0. Ovary with two, 2-ovuled cells. Style simple or 0. Stigma undivided or 2-lobed. Fruit a drupe or samara.

* ***Fruit a samara.***

1. FRAXINUS. ♄ **Trees, with .02 to .04 long, oblong to oblong-elliptical samaras.**
2. FONTANESIA. ♄ **Bushes, with elliptical, .008 long samaras.**

* * ***Fruit drupaceous or baccate.***

3. PHILLYREA. ♄ **Shrubs; fruit a small, spherical, black drupe.**
4. OLEA. ♄ **Trees; fruit a large, ovate, black drupe.**

1. **FRAXINUS,** L. Ash. *Dardâr.*

Flowers polygamous or diœcious. Calyx 4-cleft or 0. Petals 4, in pairs, connate as base, or 0. Ovary with two, 1-seeded cells and a short style. Samara flattened, winged at apex, by abortion 1-celled—Trees, usually with odd-pinnate leaves.

* *Flowers perfect, furnished with both calyx and corolla.*

1. F. Ornus, L. ♄ 5 to 15. Leaves synanthous; leaflets 3-4 pairs, lanceolate to round-ovate, denticulate. Racemes from upper and terminal axils, forming a panicle shorter than the leaves; flowers .005 long; petals linear, many times longer than calyx; samaras oblong to oblong-spathulate, sometimes tapering at both ends, at others retuse at tip — Spring — Mountains; Lebanon to Amanus.

Fig. 245.

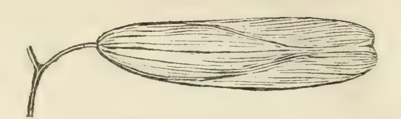


Samara of F. Ornus.

* * *Flowers naked, destitute of both calyx and corolla.*

2. F. excelsior, L. ♄ 10 to 20, buds black. Leaves hysteranthous; leaflets 4-5 pairs, oblong-lanceolate, tapering at both ends, serrate. Racemes short, crowded at apex of branches, erect and at length pendulous; flowers polygamous; samaras oblong-elliptical, obtuse, retuse, or acute at tip — Spring — Amanus, and northward.

FIG. 246.



Samara of F. excelsior.

3. F. oxycarpa, Willd. ♄ 5 to 15, buds greyish-brown. Leaves hysteranthous; leaflets 3-4 pairs, oblong-lanceolate, acuminate, serrate. Racemes short, crowded at apex of branches, erect. Samaras oblong-elliptical to oblong-spathulate, tapering at both ends or obtuse — Spring —

FIG. 247.

Samara of F. oxycarpa, var. oligophylla.

Var. **oligophylla,** Boiss. Leaves glaucescent, often simple or of 1-2 pairs of leaflets. Samaras mucronate —Lebanon and Antilebanon to Aleppo.

2. FONTANESIA, Labill. FONTANESIA. *Rumaimîn.*

Calyx short, 4-parted, persistent. Petals 4, hypogynous, connected by pairs at base. Stamens long exserted. Ovary 2-3-celled, ovules 2 in each cell, suspended; stigma bifid. Samara elliptical, winged-margined, 2-celled, 1-2-seeded, indehiscent or at length separable at septum — A shrub, with myrtle-like foliage, and minute, white flowers in axillary racemes.

F. phillyreoides, Lab. ♄ 1 to 3. Leaves short-petioled, somewhat persistent, oblong-lanceolate, .02 to .04 long, entire, acute, with cuneate base. Racemes shorter than leaves; pedicels longer than flower; petals obovate, much longer than calyx; samara .008 long, .006 broad, acute or obtuse or sometimes retuse at apex — May — Thickets and hedges; Cassius, Amanus, and northward. A fine species which might be cultivated for borders or in clumps.

FIG. 248.



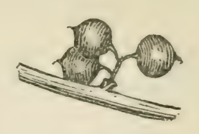
Fruiting raceme of Fontanesia phillyreoides.

3. PHILLYREA, Tourn. PHILLYREA.

Calyx short, 4-lobed. Corolla sub-rotate, 4-parted. Anthers nearly sessile. Drupe fleshy; stone papery, brittle — Shrubs, with small, evergreen leaves.

P. media, L. ♄ 1 to 3. Leaves short-petioled or nearly sessile, ovate to oblong-elliptical, .01 to .025 long, entire or acutely serratulate. Flowers short-pedicelled, clustered in axils. Calyx-lobes obtuse. Corolla-lobes ovate. Drupe globular, .004 in diameter — Spring — Lower mountain regions of Palestine and Syria, and northward.

Fig. 249.



Fruits of Phillyrea media.

4. OLEA, L. Olive. *Zeitûn.*

Calyx with 4, short teeth. Corolla almost 4-petalous. Drupe, by abortion, 1-2-seeded; fleshy part oily; stone bony —Trees with leathery leaves.

O. Europæa, L. ♄ Olive. *Zeitûn.* Branches of wild plant more or less stiff, spinescent. Leaves oblong or lanceolate, entire, white-scurfy below. Flowers in axillary racemes. Calyx cup-shaped, nearly truncate. Drupe ovate or ellipsoid — Spring — Wild in northern Syria. Cultivated everywhere for its oily fruit.

Order LXV. SALVADORACÆ, Lindl. Salvadora Family.

Shrubs with dioecious or subunisexual flowers, a gamosepalous, 4-lobed calyx, a hypogynous, 4-lobed or -petaled corolla, petals alternating with calyx-lobes, 4 stamens alternating with corolla-lobes, free ovary, sessile, bilobed stigma, and globular, 1-seeded drupe — Cells of ovary 1-2; ovules 1-4, erect anatropous; cotyledons cordate-auricled. Leaves opposite, petiole jointed to stem.

SALVADORA, Garcin. Salvadora. *Khardal.*

Flowers nearly diœcious. Calyx 5-cleft. Corolla persistent, 4-cleft. Ovary 1-celled, 1-ovuled. Berry somewhat fleshy — Glaucous shrubs, growing in thickets around the Dead Sea, and northward.

S. Persica, Garcin. ♄ 1 to 3, glabrous, branches opposite, pendant. Leaves *ovate-oblong* to oblong-linear, obtuse, tapering at base, *short-petioled.* Racemes spike-like forming a leafy panicle; calyx bell-shaped; corolla twice as long as calyx, with deflexed, revolute lobes — Spring — Around Dead Sea.

Var. **petiolata,** Post. Petioles .01 to .02 long. Tel-el-Hammâm.

Order LXVI. APOCYNACEÆ, RB. Dogbane Family.

Shrubs or perennial herbs, often with milky juice, entire, opposite or ternately whorled leaves, regular, 5-merous flowers, with the five lobes of the hypogynous, deciduous corolla twisted in bud; stamens 5, free, inserted on the corolla, alternating with its lobes, anthers incumbent on

stigma, and pollen granular—Ovaries 2, united by styles, or 1, two-celled; stigma 1; fruit a follicle, capsule, drupe, or berry. Seeds hairy or winged, rarely bald, albuminous.

* *Anthers not spurred at base. Leaves opposite.*

1. VINCA. ♃ Herbs with blue, hypocrateriform, solitary flowers, .02 broad.

* * *Anthers spurred at base. Leaves opposite or ternate.*

2. NENIUM. ♄ Shrubs with pink, cymose, hypocrateriform flowers, .04 to .05 broad.

3. APOCYNUM. ♃ Herbs with purplish, cymose flowers, .003 broad.

1. VINCA, L. Periwinkle.

Calyx 5-parted, with acuminate lobes. Corolla salver-shaped, with naked, pentagonal throat, and lobes obliquely truncate at apex. Anthers much longer than filaments, connivent above stigma. Style undivided, hairy below apex, surrounded by a stigmatose ring. Follicles smooth, striate — Perennial herbs, with opposite leaves.

1. V. herbacea, W. K. ♃ .2 to .4; stems all procumbent, not rooting at base. Leaves ovate to oblong-lanceolate, *with scabrous margins.* Peduncles axillary, as long as, *or longer* than leaves —Spring —Thickets and shady places; throughout.

2. V. Libanotica, Zucc. ♃ .2 to .4; stems all procumbent, not rooting at base. Leaves ovate to oblong-ovate, *with smooth margins.* Peduncles axillary, as long as *or shorter* than leaves — Spring — Thickets and shady places; Lebanon and Antilebanon to Nusairy Mountains, Aleppo, Marash, and northward and eastward. Too near the last.

2. NERIUM, L. Oleander. *Difleh.*

Calyx 5-parted, with linear-lanceolate lobes, glandular within. Corolla salver-shaped with 5-parted limb, and fringed crown projecting from throat. Stamens inserted on the middle of corolla tube; anthers longer than filament, adherent by middle to stigma, sagittate at base, ending at apex in long, hairy, spirally twisted bristles. Style undivided, stigma obtuse. Follicles 2, appressed, at length somewhat separate. Seeds numerous, hairy— Shrubs with very showy, pink or white flowers, and milky juice.

N. Oleander, L. ♄ 1 to 4, clumped. Leaves opposite or ternate, leathery, oblong-lanceolate, minutely tomentellous beneath. Flowers corymbose-cymose; pedicels and calyx tomentellous; plume of anther scarcely overtopping throat of corolla — Summer — Banks of streams from el-Ghor to 1000 m. in mountains.

3. APOCYNUM, L. Dogbane.

Calyx 5-parted, not glandular within. Corolla small, campanulate, 5-cleft; appendages 5 from base of tube, alternating with lobes. Stamens inserted at base of tube, filaments strap-shaped, anthers longer than filaments, sagittate, adherent by middle to stigma, ending in

an acute, membranous tip. Nectary consisting of 5 glands. Style nearly 0; stigma ovoid, dilated, somewhat 2-lobed at apex. Follicles 2, slender, elongated. Seeds long-hairy — Herbs, with shrubby base, milky juice, and opposite leaves.

A. Venetum, L. ♃ .5 to 1, paniculate. Leaves glabrous, ovate to elliptical and oblong, mucronulate, with cartilaginous margins. Cymes terminal, compound; calyx canescent, with acute, triangular lobes; corolla-lobes as long as tube — Summer — Swamps, and especially salt marshes; Marash, and westward and eastward.

ORDER LXVII. **ASCLEPIADEÆ,** R. Br. (MILKWEED FAMILY).

Herbs or shrubs, generally with milky juice, and opposite, entire leaves or 0, *a* 5-*parted, persistent calyx, a monopetalous, regular, hypogynous corolla,* 5 *stamens inserted on base of corolla, filaments (except in Periploca) connate in a tube (gynostegium), including the pistil, anthers attached to the stigmas by means of connate spurs, styles* 2, *connate at apex, stigma* 1, *pentagonal, having brown glands at angles alternating with anthers. Pollen-masses as many as anther-cells, adherent to the stigmatic glands; follicles* 2, *seeds usually hairy* — Anthers 2- or incompletely 4-celled. Crown at throat of corolla entire, lobed, or composed of separate scales, or 0.

* *Filaments free or united below. Pollen-masses granular, separately applied to stigmatic glands.*

1. PERIPLOCA. Shrubs, with brownish-green or yellow flowers.

* * *Filaments connate. Pollen-masses waxy, fixed to the stigma in pairs by a gland, hanging vertically.*

† *Anthers ending in a hyaline or opaque membrane, projecting above disk.*

‡ *Pollen-masses pendulous, beneath the margin of the stigma.*

§ *Crown of scales not adherent to gynostegium.*

2. GLOSSONEMA. ♃ Herbs; leaves ovate-oblong to linear; clusters axillary; flowers minute.
3. SOLENOSTOMA. ♄ Stiff-branched; leaves ovate-oblong; umbels axillary; flowers white.
4. OXYSTELMA. ♃ Climbing herbs, leaves linear; racemes axillary; flowers pink.

§ § *Crown of scales adnate to gynostegium or dorsum of anthers.*

5. GOMPHOCARPUS. ♄ Low shrubs; leaves oblong- to linear-lanceolate. Flowers not inflated
6. CALOTROPIS. ♄ Small trees; leaves large, obovate; follicles obovate, inflated.

§ § § *Crown entire or lobed, adnate to gynostegium.*

¶ *Longer lobes of outer or single crown opposite anthers.*

7. VINCETOXICUM. ♃ Low, perennial herbs, with ovate leaves.
8. CYNANCHUM. ♃ Twining, herbaceous perennials, with cordate leaves.
9. PENTATROPIS. ♃ Twining perennials, with oblong to elliptical leaves.

¶ ¶ *Longer lobes af outer or single crown alternate with anthers.*

10. DÆMIA. ♄ Twining, climbing; leaves cordate or reniform.

‡ ‡ *Pollen-masses at the level of the margin of the stigma or above it.*

11. CIONURA. ♃ Tall, erect herbs, shrubby at base; leaves cordate-ovate.

† † *Anthers obtuse at tip, with short appendage or* 0.

12. LEPTADENIA. ♄ Leafless shrubs, with aspect of Spartium junceum.

† † † *Anthers obtuse at tip, not appendaged, incumbent over disk or immersed in it.*

13. BOUCEROSIA. ♃ Fleshy, leafless herbs, with tetragonal branches and aspect of Stapelia.

1. PERIPLOCA, L. PERIPLOCA. *Ḥalâb.*

Corolla rotate, with 5, spreading or reflexed lobes, alternating with aristate scales. Filaments free; anthers bearded at back, adherent at tip, apiculate beyond cells. Pollen-masses solitary, made up of 4, coherent granules. Follicles terete, smooth — Shrubs, with brownish-green or yellow flowers.

* *Tall shrubs, more or less climbing by twining of stems.*

1. P. Græca, L. ♄ Leaves opposite, ovate to oblong-lanceolate, obtuse or acute, .05 to .1 long, glabrous, short-petioled. Cymes terminal, loose; corolla .015 to .02 broad, *brownish-green*, lobes oblong, retuse, bearded at margin; scales of crown 2-auricled, ending in an undivided awn; follicles somewhat divergent — Spring — Galilee to Leontes Valley, Phœnician plain, Lebanon, Marash, and northward and eastward.

Var. **oblongifolia,** Post. Leaves oblong to oblong-lanceolate, acuminate — Abeih (Lebanon).

2. P. lævigata, Ait. ♄ Branches short, rigid, the upper only twining. Leaves opposite or clustered, nearly sessile, oblong to elliptico-linear, obtuse or acute, much smaller than in the last, glabrous, nearly sessile. Cymes terminal, few-flowered, shorter than leaves; corolla .005 to .008 broad, *yellow*, *glabrous*, *except an ovate*, *woolly spot* near middle of obtuse or retuse lobes; scales of crown 2-auricled, ending in a simple awn; follicles horizontal — Spring — Lattakia.

* * *Rigid, almost leafless shrubs, not twining or climbing.*

3. P. aphylla, Dec. ♄ 1 to 2; branches long, often pendulous, naked, resembling those of Spartium junceum, velvety-canescent while young, then glabrous. Leaves few, .002 to .003 long, ovate, canescent, mucronulate, nearly sessile. Cymes in axils of abortive leaves, nearly sessile, densely flowered; corolla brownish-purple, .008 to .01 broad, lobes ovate, obtuse or retuse, concave, bearded along upper half of margin; scales 2-auricled, ending in a simple awn; follicles velvety, then glabrous, tapering, horizontal — Spring — Shittim plain.

2. GLOSSONEMA, Decaisne. GLOSSONEMA.

Calyx 5-parted. Corolla subcampanulate, deeply 5-parted, lobes fleshy above. Crown consisting of 5, flat leaves, adnate to base of corolla, tapering at tip into filaments; pollen-masses ovate, pendulous from ascending funicles. Follicles unarmed or spiny —Perennial herbs.

G. Boveanum, Dec. ♃ .3, more or less canescent, branching from base, more or less prostrate. Leaves short-petioled, truncate or cuneate at base, ovate-oblong to lanceolate or linear, .01 to .03 long,

with sinuate or crisp-wavy margins. Flowers .003 long, few, clustered at axils, longer than pedicels; apex of lobes of crown obtuse, retuse, with cusp in sinus, or tapering to a cusp; follicles .02 to .04 long, clothed with soft spines and sometimes tubercled — Spring — Gorges east of Dead Sea.

3. **SOLENOSTOMA,** Hayne. Solenostoma. *'Arjel.*

Calyx 5-parted. Corolla 5-parted, with erect, oblong-linear lobes. Crown cup-shaped, thick, with 5, short, rounded lobes, surrounding the base of the long-stipitate gynostegium. Pollen-masses club-shaped, flattened, pendulous. Stigma pentagonal, flattish. Follicles oblong-ovoid, unarmed, cartilaginous — A desert shrub with umbelled flowers.

S. Argel, Del. .6 to 1; branches terete, erect, leafy. Leaves fleshy, glaucous, minutely velvety, nearly sessile, ovate-oblong to elliptical, acute. Umbels axillary, short-peduncled; corolla .008 to .01 broad, white — Spring — Wadis south of Dead Sea, and southward.

4. **OXYSTELMA,** R. Br. Oxystelma. *Libbein.*

Calyx 5-parted. Corolla rotate, with 5, triangular, ciliate lobes, and a papillose, expanded ring at throat. Gynostegium exserted. Crown composed of 5, transversely broader leaves, inflated below and tapering to a slender strap above, overtopping the gynostegium. Pollen-masses clup-shaped, flattened, tapering at tip, pendulous; stigma muticous; follicles unarmed — Perennial, climbing herbs.

O. Alpini, DC. ♃ Branches slender. Leaves .04 long, linear, acute, tapering at base. Racemes 2-5-flowered, axillary, as long as leaves; corolla pink, .015 to .02 broad, with broad, short-triangular, ciliate lobes; follicles oblong, acuminate, twin, glabrous — Spring — El-Ghor, south of Dead Sea, and southward.

5. **GOMPHOCARPUS,** R. Br. Gomphocarpus. *'Arjel.*

Calyx 5-parted. Corolla 5-parted, rotate or reflexed. Crown of 5 leaves, adnate at base to gynostegium, concave, hooded, urn-shaped. Anthers membranous-tipped. Pollen-masses coulter-shaped, tapering at tip. Stigma flattened, pentagonal. Follicles inflated, echinate with soft spines — Perennial herbs or shrubs; flowers umbelled in upper axils.

1. G. fruticosus, L. ♄ 1, *glabrescent*, or minute-velvety, *green;* branches simple, wand-like. Leaves subsessile or short-petioled, oblong- to linear-lanceolate, .1 to .15 long, mucronate. Corolla .01 to .015 broad, *white*, lobes ovate, reflexed, hirsute at margin, otherwise glabrous; apex of leaves of crown truncate, with *two* teeth at each inner angle, the inner straight, the outer longer, curved outwardly; follicles ovate-oblong, *glabrescent* between bristles — Spring — Wadis south of Dead Sea. (Tristram).

2. G. Sinaicus, Boiss. ♄ *Gheil. Ghalqat-ed-Dîb. 'Argel.* 1, *crisp-canescent;* branches simple, wand-like, leafy. Leaves short-petioled, oblong- to linear-lanceolate, .04 to. 06 long, acute, muticous or mucronulate. Corolla .01 to .015 broad, *yellowish*, lobes reflexed, ovate,

pubescent without; apex of leaves of crown truncate, with *one* tooth at each inner angle; follicles oblong, tapering, mealy-tomentellous between red bristles — Spring — Wadis south of Dead Sea, and southward to Sinai.

6. CALOTROPIS, R. Br. CALOTROPIS. *'Ushr. 'Ushâr.*

Calyx parted to base. Corolla hemispherical-campanulate, with a short, angled tube, bulging inward at angles, and a deeply cut limb. Staminal crown consisting of 5, keeled leaflets, vertically adherent to gynostegium, gibbous below. Pollen-masses coulter-shaped, fastened by tapering tip. Stigma 5-angled, apiculate. Follicles inflated, obovate.

C. procera, Willd. ♄ Apples of Sodom? *'Ushr. 'Ushâr. Mantaneh.* 3 to 5; bark corky, white; juice milky. Leaves obovate, .1 to .15 long, sessile, fleshy, mealy-velvety especially at lower surface, beset with awl-shaped glands at insertion. Corolla .02 broad, pink, lobes ovate, spreading, with somewhat revolute margin; follicles .04 to .08 long (called *Beid-el-'Ushâr*) — Spring — El-Ghor, and around Dead Sea, and southward to Sinai and Egypt.

7. VINCETOXICUM, Mœnch. VINCETOXICUM.

Calyx 5-parted. Corolla rotate, deeply 5-lobed. Crown shield-shaped, fleshy, simple, not spurred within, 5-10-lobed. Pollen-masses bulging, pendulous. Stigma apiculate. Follicles oblong-terete, horizontal, unarmed — Perennial, erect herbs, sometimes somewhat twining.

V. canescens, Willd. ♃ .3 to .4, tomentellous; stems erect. Leaves ovate, acute, short-petioled, .04 to .06 long. Umbels axillary and terminal, ∞-flowered; flowers short-pedicelled; corolla yellow, .003 to .005 broad, hirsute within; lobes of crown 5, obtuse; follicles canescent then glabrescent, .03 .04 long, .008 to .01 in diameter near base — Summer — Middle to subalpine Lebanon, Antioch, Kurd Dagh, Aintâb, Marash, and northward.

8. CYNANCHUM, L. CYNANCHUM.

Calyx 5-parted. Corolla rotate, deeply 5-parted. Crown tubular-campanulate, enclosing gynostegium, 10-lobed, the outer 5 lobes longer, the inner 5 opposite the outer. Pollen-masses ovate, divergent. Stigma 5-angled, 2-tubercled. Follicles unarmed, usually (by abortion) solitary — Twining, herbaceous perennials.

C. acutum, L. Glabrous below, puberulent above. Leaves cordate-auricled at base, acuminate. Umbels axillary, peduncled; calyx more or less pubescent, one-third as broad as .006 to .008 broad, white or pink corolla; follicles cylindical-tapering, .09 to .12 long, .008 in diameter — June to September — Coast; el-'Arabah; el-Ghor; Antioch, and northward and eastward.

9. PENTATROPIS, R. Br. PENTATROPIS.

Calyx 5-parted. Corolla rotate, deeply 5-parted, with slender, long-tapering lobes, at length deflexed. Crown double, the outer reduced to 5-teeth opposite the inner, or 0, the inner 5 leaflets adnate to gynostegium, free above, spurred below. Anthers ending in a membranous tip. Pollen-masses ovoid — Perennial, twining, climbing herbs, with greenish flowers.

P. spiralis, Forsk. ♃ 1 or more, glabrous, branched, twisted and tangled. Leaves .01 to .04 long, short-petioled, rounded at base, elliptical to oblong and oblong-lanceolate. Flowers .015 to .02 broad, solitary in axils, or few-fascicled, on capillary pedicels — Spring — Hot springs at Callirrhoe, and Ghor-es-Safieh to Wadi Harûn, and southward.

10. DÆMIA, R. Br. Dæmia.

Calyx 5-parted. Corolla salver-shaped, with short tube, and rotate, 5-parted limb. Crown double, the outer short, annular, sinuate, 10-lobed, the inner of 5 leaves, free below and spurred, tapering above into an awl-shaped awn. Pollen-masses flattened, tapering. Stigma muticous. Follicles unarmed, or clothed with soft spines — Twining, climbing shrubs.

D. cordata, R. Br. ♄ *Lebben-el-Hamârah. 'Atmeh. Ghalqah.* Woolly-canescent, the young branches twining around the old. Leaves petioled, .015 to .03 long, cordate or reniform. Umbels axillary, on a peduncle longer than leaves; pedicels much longer than whitish-yellow flowers; corolla .008 broad, with ciliate margin, and tube a little longer than brownish, hirsute calyx; follicles .06 long, inflated below, long-beaked — Spring — Wadis about Dead Sea, and southward to Sinai and Egypt.

11. CIONURA, Griseb. Cionura.

Calyx 5-parted. Corolla 5-parted, with spreading lobes. Crown composed of 5, oblong-linear, free leaves, about as long as gynostegium. Stigma long-beaked, bifid, much longer than gynostegium. Pollen-masses ovate, erect, small. Follicles unarmed —Erect herbs, with shrubby base.

C. erecta, L. ♃ or ♄ Glabrous; stems somewhat climbing by twining above. Leaves long-petioled, cordate to ovate-cordate, short-tapering. Cymes peduncled, many-flowered, axillary, supra-axillary, and terminal; calyx-lobes short, ovate; corolla .008 broad, white, lobes linear; follicles .08 to .1 long, .01 broad, tapering, glabrous — June and July — Amanus to Aintâb, Marash, and eastward and northward.

12. LEPTADENIA, R. Br. Leptadenia. *Markh.*

Calyx short, 5-parted. Corolla rotate, 5-parted, with very short tube, and woolly-lobes with revolute margins, alternating with 5, glandular gibbosities. Crown 0. Anthers contiguous or free. Pollen-masses erect with pellucid apex, inserted by means of an inflated, short stipe. Stigma muticous. Follicles unarmed — Leafless shrubs.

L. pyrotechnica, Forsk. ♄ *Markh.* Trunk tuberous; branches and twigs wand-like, stiff, terete. Clusters of almost sessile flowers on short, at length thickened, recurved peduncles; corolla .007 broad, whitish-grey; follicles .1 to .13 long, .005 thick, sparingly puberulent, pendulous — Spring — Deserts about the Dead Sea, and southward to Sinai and Egypt, and eastward.

13. BOUCEROSIA, Wight. Boucerosia.

Calyx fleshy, 5-parted. Corolla somewhat campanulate, 5-cleft, with acute sinuses, and triangular lobes, warty within. Crown united,

double, the inner row surrounding gynostegium, its lobes incumbent on anthers, and touching stigma, the outer row with subulate, horned, divergent lobes. Pollen-masses erect. Stigma muticous. Follicles unarmed, tapering at apex — Fleshy, leafless herbs, with tetragonal branches, dentate at angles, with aspect of Stapelia.

1. B. Aaronis, Hart. ♄ .08 to .15, pale brownish-yellow; stems erect, sparingly branched, remotely tubercled, dentate. Flowers livid-purple; clustered at apex of branches; corolla mottled, .013 broad, with 5, ovate-triangular lobes, glabrous or obsoletely puberulent within — December — About Jebel Harûn and Abu Kosheibah.

2. B. Sinaica, Decaisne, ♃ Branches elongated, slender, obsoletely angled-grooved. Flowers solitary at apex of branches; corolla small, 5-fid, lobes subdeltoid, hairy within; inner leaves of crown ligulate, acute, much longer than outer — Winter — Sinai.

FIG. 250.



Flowering stem of B. Aaronis.

ORDER LXVIII. GENTIANEÆ, Juss. (GENTIAN FAMILY).

Glabrous herbs, with colorless, bitter juice, opposite and sessile, entire and simple, exstipulate leaves, regular flowers, with the free stamens as many as the lobes of the hypogynous corolla, alternate with them, a 1-celled, ∞-ovuled ovary, with 2, parietal placentæ, two styles more or less connate, a 2-valved, septicidal, ∞-seeded pod, and albuminous seed with straight embryo — Calyx-lobes 4-8. Corolla-lobes 4-8, twisted in bud, persistent. Capsule 1-celled, with margins of valves seed-bearing, or falsely 2-celled from bending in of margins of valves so as to form a septum, in which case the placentæ appear central.

* *Capsule 1-celled.*

1. CHLORA. Flowers 6-8-merous, yellow.

* * *Capsule more or less 2-celled from bending in of margins.*

2. ERYTHRÆA. Flowers 5-merous, pink, white or yellow.

1. CHLORA, L. CHLORA.

Calyx 8-6-parted. Corolla salver-shaped, marcescent, with short, inflated tube, and 8-6-parted limb. Stamens 8-6, inserted on throat. Style filiform, caducous; stigma 2-parted. Capsule 1 celled, with 2, septicidal valves, more or less introflexed and adnate at margins — Annual, yellow flowered, glaucous herbs, with corymbose inflorescence.

1. C. perfoliata, W. ⊙ .3 to .7. Stem-leaves triangular-ovate, *connate at base by their whole breadth.* Calyx parted to base, with 8, subulate, 1-*nerved* lobes, *shorter* than corolla; corolla lobes obtuse — April to September — Wet places; coast and lower and middle regions of Lebanon.

2. C. serotina, Koch. ⊙ .5 to .7; stem-leaves ovate, or ovate-lanceolate, *narrower at connate base.* Calyx deeply parted into 8, lanceolate-subulate, 3-*nerved* lobes, *nearly as long as* corolla; corolla-lobes acute or acuminate — Summer — Wet places; Lattakia to Marash, and northward.

2. ERYTHRÆA, Ren. CENTAURY. *Qanṭariyûn. Qanṭariyân.*

Calyx tubular, 5-cleft. Corolla funnel-shaped, marcescent, with cylindrical tube and 5-cleft limb. Stamens 5, inserted on upper part of corolla-tube; anthers exserted, at length spirally twisted. Style filiform, undivided or 2-cleft, deciduous; stigma bilamellate or undivided. Capsule 2-valved, septicidal, margins more or less introverted; placentæ sutural — Monocarpic herbs.

* *Corolla pink, rarely white. Style undivided. Stigma 2-lobed or -parted.*

1. E. ramosissima, Pers. ⊙ .2 to .6, much branched, cymose-fastigiate. Leaves *oblong to oblong-linear*, the upper acute. Flowers solitary, rather long-pedicelled, *the lateral distant from bracts;* corolla-tube somewhat longer than calyx, lobes elliptical-oblong, rather obtuse — April to July — Sterile fields; common, especially along coast.

Var. **albiflora,** Boiss. Corolla white.

2. E. latifolia, Sm. ⊙ .3 to .6, stiff-branched, cymes dense. Leaves *ovate to oblong, obtuse.* Flowers clustered, bracted at base; corolla-tube a little longer than calyx, lobes lanceolate, acutish — May and June — Rare along coast.

3. E. Centaurium, Pers. ② .3 to .6, compactly corymbose above. Leaves ovate-oblong. Flowers sessile at apex of branches, bracteate at base; corolla-tube *nearly twice as long as calyx,* lobes ovate, obtuse; capsule somewhat 2-celled — May and June — Common in fields, especially in mountains.

The above three species are too near each other.

* * *Corolla yellow. Style 2-cleft. Cymes dichotomous.*

4. E. maritima, L. ⊙ .2 to .5, simple, one-flowered, or branching above. Leaves elliptical to oblong, obtuse, upper acutish. Cyme few-flowered, loose; flowers *pedicelled;* corolla .02 long, tube somewhat longer than calyx, lobes ovate, acutish; valves of capsule slightly introflexed — Spring — Fields along coast; lower zone of Lebanon.

* * * *Corolla pink. Style undivided. Flowers in spike-like, cymose racemes.*

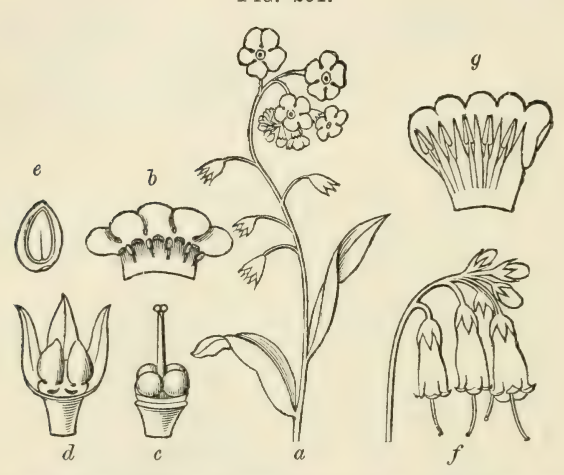
5. E. spicata, L. ⊙ *Menash-ed-Dibbân.* .2 to .5; stem densely leafy, branching above. Leaves oblong, nearly 5-nerved. Flowers nearly sessile, bracteate; corolla-tube as long as calyx, lobes lanceolate, acute — June — Swampy places along coast.

ORDER LXIX. BORRAGINEÆ. (BORAGE FAMILY).

Trees, shrubs, or annual or perennial, usually rough-hairy herbs, with mucilaginous juice, alternate or rarely opposite, undivided leaves, symmetrical flowers, with a five-

cleft or -parted calyx (in Cordia sometimes irregularly 3-8-*toothed), a regularly* 5-*lobed corolla (in Echium, Echiochilon, and some Anchusæ irregularly* 5-*lobed, and in Cordia* 6-8-*parted), stamens usually* 5, *inserted on the corolla, alternating with its lobes, and a single style* — Stamens rarely 4 sterile and 1 fertile. Pistil composed of one, 1-celled, two, 2-celled, or four, 1-celled ovaries, each 1-seeded. Style terminal or basilar, arising from middle of cells. Fruit a green drupe, or twin, 2-celled pyrenes, or quadruple, 1-celled nutlets. Seeds with or without albumen. Inflorescence usually in a scorpioid cyme or raceme.

FIG. 251.



(*a*) Flowering stem of Myosotis, showing the 5-fid calyx, the 5-lobed, gamopetalous corolla, and the scorpioid inflorescence, and undivided leaves. (*b*) The corolla laid open, showing the stamens alternating with the corolla-lobes, and inserted into the corolla tube, and between them the scales which constitute the crown at the throat of the corolla. (*c*) The 4-lobed pistil, from the middle of the cells of which arises the style. (*d*) Three lobes of the calyx, with two akenes out of the four in situ. (*e*) One of the akenes cut lengthwise. (*f*) A raceme of Symphytum. (*g*) The corolla laid open, showing the stamens and intervening scales of the crown.

TRIBE I. **CORDIEÆ.** Ovary single with terminal style. Fruit a green drupe. Seeds 4, exalbuminous.

1. CORDIA. Glabrous or scabrous trees, the fruit used in making bird-lime.

TRIBE II. **HELIOTROPEÆ.** Ovary single, with terminal style and 4 sutures. Fruit (in ours) dry, separating into 2 pyrenes or 4 nutlets. Seeds sparingly albuminous — Herbs or shrubs.

2. HELIOTROPIUM. Stigma surrounded at base by a fleshy ring.

TRIBE III. **BORRAGEÆ.** Ovary consisting of two, 2-parted, rarely 2-celled carpels. Style arising from base, between carpels. Nutlets four, 1-celled, or two, 2-celled. Seeds exalbuminous — Herbs or shrubs.

SUBTRIBE I. **CYNOGLOSSEÆ.** Nutlets 4, inserted by inner face, on a flat, convex, conical or columnar gynobase, their tips projecting little if any above it.

* *Fruiting calyx growing. Nutlets inserted by whole inner face. Strigose herbs.*

3. TRICHODESMA. ⊙ Anthers exserted, connivent, twisted.

4. CACCINIA. ② Anthers unequal, the posterior long-exserted. Base of style cup-shaped in fruit.

* * *Fruiting calyx growing but little. Nutlets divergent, sacculate below insertion.*

† *Stamens included.*

5. CYNOGLOSSUM. ⊙ ② Herbs, with prickly nutlets and a strong odor.

† † *Stamens exserted.*

6. SOLENANTHUS. ♃ Anthers oblong, entire. More or less pubescent herbs.

7. TRACHELANTHUS. ♃ Anthers linear, sagittate at base. Glabrous herbs.

* * * *Fruiting calyx unchanged. Nutlets inserted on a pyramidal column.*

8. RINDERA. ♃ Disk of nutlets not tubercled; wings entire, repand or denticulate.

9. PARACARYUM. ♃ Disk of nutlets usually muricate, rarely smooth; wings denticulate or entire.

SUBTRIBE. II. **ERITRICHEÆ.** Nutlets 4, rarely 2 or 1, inserted by inner face on an elevated, conical, oblong, or columnar gynobase, their tips more or less prominent above it, free.

* *Articular surface of nutlets extending from base to middle or higher.*

10. ECHINOSPERMUM. ⊙ ② Herbs, with ascending or spreading leaves, and loose racemes.

11. ECHIOCHILON. ♄ Shrubs, with white branches, minute, appressed leaves, and short terminal spikes.

12. ROCHELIA. ⊙ Herbs, with spreading leaves; lobes of fruiting calyx incurved.

* * *Articular surface of nutlets at middle of inner face, small.*

13. ASPERUGO. ⊙ Prostrate herbs; calyx 2-valved in fruit; nutlets warty.

SUBTRIBE III. **ANCHUSEÆ.** Nutlets 4, inserted on a flat or short-conical gynobase by a concave surface usually surrounded by a ring, which is sometimes left on the gynobase when the fruit is shed.

* *Throat of corolla with 5 scales.*

14. SYMPHYTUM. ♃ Corolla cylindrical or funnel-shaped; lobes nearly erect.

15. BORAGO. ⊙ Corolla rotate; lobes spreading.

16. ANCHUSA. ⊙ ② ♃ Corolla funnel-shaped, sometimes bilabiate; lobes spreading.

* * *Throat of corolla naked.*

17. NONNEA. ⊙ Squamules of corolla half way down its tube.

18. ALKANNA. ♃ Throat of corolla with small, transverse wrinkles.

SUBTRIBE IV. **LITHOSPERMEÆ.** Nutlets erect or incurved, inserted on a flat, convex, or slightly conical gynobase by a flat surface at base or inner angle.

* *Racemes not bracted. Anthers obtuse at tip.*

19. MYOSOTIS. ⊙ ♃ Corolla-scales at throat; limb twisted to the left.

* * *Racemes bracted. Anthers obtuse at tip.*

20. LITHOSPERMUM. ⊙ ♄ Anthers included, straight. Corolla-lobes spreading. Style entire.

21. MOLTKIA. ♄ Anthers exserted, curved. Corolla-lobes erect. Style entire.

22. ARNEBIA. ⊙ ♃ Anthers included, straight. Corolla-lobes spreading. Style bifid.

23. ECHIUM. ⊙ ② ♃ Corolla more or less bilabiate, 5-lobed.

**** Racemes bracted. Anthers acuminate at tip, sagittate at base.*

24. ONOSMA. ⊙ ② ♃ Nutlets straight, the basilar areola not stalked.

25. PODONOSMA. ♃ Nutlets curved, the basilar areola somewhat stalked.

SUBTRIBE V. **CERINTHEÆ.** Nutlets 2, two-celled, inserted by a flat surface on the torus, free from gynobase and styles.

26. CERINTHE. ② ♃ Glabrous, glaucescent herbs, with .02 long, yellow flowers.

1. CORDIA, L. CORDIA.

Calyx tubular or campanulate, 5- or irregularly 3-8-toothed. Corolla funnel-shaped, with 5-, rarely 6-8-parted limb. Stamens exserted or included. Ovary with four, 1-ovuled cells. Style twice forked. Drupe pulpy with hard endocarp. Cotyledons folded lengthwise — Glabrous or somewhat scabrous trees.

C. Myxa, L. ♄ *Dibq.* 5 to 8. Leaves long-petioled, orbicular to ovate, .05 to .15 long, glossy above, obtuse or mucronate. Cymes loose, polygamous; calyx-teeth short-ovate; corolla-tube as long as calyx, lobes oblong-linear, recurved; anthers exserted; stigmas fan-shaped; drupe .013 long, mucronate — January to May — Cultivated everywhere. Spontaneous in Ghor. Fruit edible, principally used in making bird-lime. Bark a tonic. Wood used to kindle fire by friction; formerly used by ancient Egyptians to make sarcophagi.

2. HELIOTROPIUM, L. HELIOTROPE. TURNSOLE.

Calyx 5-parted, persistent, or deciduous with the fruit. Corolla funnel-shaped or salver-shaped, with 5-lobed or -parted limb, frequently with 5, supplementary lobes in the sinuses. Anthers nearly sessile, the connective often ending in a cusp. Style simple, stigma with broad base surrounded by a fleshy rim, cup-shaped, conical, or subulate, entire or bifid. Nutlets 4, or fewer by abortion, distinct or coherent, or connate in pairs, or concrete in a 1-seeded caryopsis — Herbs or shrubs.

* *Annuals.*

† *Corolla-lobes imbricated in bud.*

‡ *Calyx deciduous with fruit. Nutlets concreted into a single, 1-seeded caryopsis.*

1. H. supinum, L. ⊙ *Ghubeirah.* .2 to .4, *prostrate*, ashy-grey, hair of branches spreading, that of leaves appressed. Leaves all petioled, .005 to .015 long, ovate, obtuse, the upper face plicate. Racemes dense; flowers minute; calyx-lobes *connivent in fruit enclosing caryopsis and falling with it;* corolla hirsute without; stigma elongated-conical, 4-lobed; nutlet glabrous, *plano-convex* — Summer — Places overflowed in winter, along Syrian coast.

Var. **Boissieri,** Post. Leaves rounded-elliptical, .01 or less long. Racemes loose in fruit — Summit of Akher Dagh, 2000 m.

‡ ‡ *Calyx persistent after the shedding of the fruit. Nutlets* 4.

¶ *Stigma tapering from a conical base.*

2. H. Aleppicum, Boiss. ⊙ .3 to .4, strigose-woolly, dichotomously branching from base. Leaves *oblong, to oblong linear,* .01 to

.03 long, acute, tapering at base, the lower short-petioled. Racemes rather loose, bracteate below; flowers minute; calyx-lobes erect; corolla hirsute without, glabrous within; stigma nearly sessile, subulate above, *penicillate at apex;* nutlets glabrous — May to September — Fields; Phœnician coast to Hamath, Aintâb, Aleppo, and northward.

3. H. Europæum, L. ⊙ *Sekrân. 'Ufein.* .3 to .5, green, scabrous, with *short, appressed hairs* tubercled at base. Leaves petioled, elliptical, obtuse. Corolla-tube hirsute within; stigma puberulent or glabrous on short style, *longer than broad* — Summer and autumn — Fields and roadsides.

Var. **tenuiflorum,** Boiss. More canescent. Stigma more pubescent. Nutlets hispid — Common throughout.

¶ ¶ *Stigma cup-shaped (depressed-conical).*

4. H. villosum, Willd. ⊙ .3 to .4, tomentose with dense, short, appressed wool, *intermixed with longer, spreading hairs.* Leaves petioled, ovate, obtuse; corolla glabrous or hirsute within, ribs ending in a tooth below the throat; anthers adnate below middle of tube; stigma nearly sessile, *much broader than long* — Summer and autumn — Fields and roadsides; common.

Var. **brevilimbum,** Boiss. Limb of corolla smaller — Syrian coast.

† † *Corolla-lobes more or less valvate, connivent in bud, straight or curved.*

‡ *Limb of corolla 5-lobed.*

5. H. Schweinfurthii, Boiss. ⊙ .3 to .4, appressed-woolly, canescent. Leaves petioled, ovate, obtusish, lineate at upper surface, and prominently nerved at lower. Corolla hirsute; anthers near base of corolla-tube, *ending in a long, hooked point;* style short; stigma broad at base, conical-subulate, hirsute at tip — Summer — Near Shetûrah.

6. H. Bovei, Boiss. ⊙ .3 to .5, appressed-canescent. Leaves petioled, ovate to elliptical, obtuse, lineate at upper surface, prominently nerved below. Racemes *long,* loose; corolla glabrous within, *limb as long as tube,* with or without teeth in sinuses; anthers inserted below middle of tube, but *reaching to its throat,* with inflexed tip; stigma *nearly sessile,* long-tapering, hispid above; nutlets hispidulous or glabrous, tubercled — May to September — Fields; Syrian coast to Cœlesyria, Aintâb, Marash, and northward and westward.

‡ ‡ *Limb of corolla with 5, supplementary lobes in sinuses.*

7. H. circinnatum, Griseb. ⊙ .3 to .5, soft-appressed-villous, canescent, much branched. Leaves ovate and oblong, obtuse, short-petioled, prominently nerved at lower surface. Racemes often .3 long, loose; corolla .005 long, hirsute without, glabrous within, *limb longer than tube,* lobes *triangular at base, awl-shaped at apex, circinnate in bud,* the intermediate a little shorter; anthers with inflexed tips; stigma elongated, conical; nutlets smooth, glabrous — Summer — Gravelly places; Marash, and eastward.

* * *Perennial, low, shrubby plants.*

† *Corolla-lobes triangular-linear, with involute margin, connivent in bud.*

8. H. luteum, Poir. ♄ *Ḥismah. Fureish. Ḥalamah. Reḥamah. Rughl. Natash.* .2 to .4, much branched, retrorsely tomentellous, canescent. Leaves .01 to .015 long, *oblong to ovate,* usually wavy-margined, depressed-lineate at upper surface. Racemes .01 to .04 long, dense; corolla-tube silky without, glabrous within, *once and a half* as long as calyx, lobes *inflexed, much shorter* than tube; anthers *retuse,* inserted on throat; stigma long-conical, *half as long as style,* hirsute at apex; nutlets large, *densely silky* or glabrescent — Spring — Sandy places; Wadi Zuweirah at south end of Dead Sea, and southward to Sinai and Egypt.

† † *Corolla-lobes ovate or oblong, imbricated in bud; tube glabrous inside, silky or hirsute outside.*

9. H. rotundifolium, Sieb. ♄ .3 to .5, with ascending, white-woolly branches. Leaves .015 to .02 long, *orbicular to ovate,* depressed-lineate at upper surface, prominently nerved at lower. Racemes .04 to .07 long, at length lax; corolla-tube silky without, *nearly twice* as long as calyx, lobes *short-ovate,* obtuse, *as long as* tube, *spreading;* anthers acute, inserted below middle of tube; stigma *nearly sessile,* long-conical, hirsute at apex; nutlets minutely tubercled, glabrous — Summer — Hillsides; Antilebanon and Damascus to Jerusalem, Wadi Zuweirah, and the borders of the Tîh.

10. H. Arbainense, Fresen. ♄ *Rahâḥ. Qurfeh.* .2 to .4, erect, *greenish-yellow,* beset with short, viscid wool and longer hairs. Leaves oblong to ovate, .01 to .015 long, *tapering to a petiole,* acutish, wavy-margined. Racemes .05 to .1 long, 1-ranked; corolla-tube nearly twice as long as calyx, *strongly ribbed, ribs ending beneath throat in small teeth;* limb shorter than tube, lobes repand; stigma *depressed-conical, glabrous, nearly sessile;* nutlets netted, glabrous — Spring — Sandy places; Ghor-es-Ṣâfieh, and southward in the Tîh to Sinai.

11. H. undulatum, Vahl. ♄ .2 to .4, *procumbent, grey,* beset with hairs tubercled at base. Leaves *oblong to oblong-linear,* .01 to .06 long, nearly sessile, wavy, crisp-margined. Racemes .02 to .03 long, 2-*ranked;* corolla-tube a little longer than calyx; lobes *shorter* than tube; stigma *elongated-conical, hairy,* 4-lobed, *somewhat longer* than style; nutlets hirtulous, separable — Spring — Sandy places; about Dead Sea, to Gaza, and southward to Sinai and Egypt.

12. H. Persicum, Lam. ♄ .2 to .4, rough with grey bristles; stems erect. Leaves nearly sessile, *lanceolate to linear,* acutish, wavy-margined. Spikes rather loose, 1-*ranked;* corolla-tube somewhat longer than calyx; lobes *somewhat longer* than tube; stigma *short-conical,* somewhat longer than style; nutlets hirtulous, separable — Spring — Sinai to Egypt, and eastward.

H. Peruvianum, L. is the cultivated *Sweet Heliotrope.*

3. TRICHODESMA, R. Br. Trichodesma.

Calyx deeply 5-cleft. Corolla scarcely longer than calyx, campanulate, lobes broad, with awl-shaped tips, and naked throat. Stamens

inserted on tube, with short filaments and long anthers, velvety or woolly at back, with awl-shaped tips twisted to the left, connivent in a cone. Style filiform. Nutlets erect, central column quadrangular — Strigose, desert herbs, leaves in ours opposite.

1. T. Africanum, L. ⊙ ♃ *Khuḍr. Shauk-ed-Ḍab'. Ḥamîmah. Ḥurreiq. Lizzeiq.* .4 to .5, *glabrous or pubescent between prickles.* Leaves oblong-ovate to oblong, *with truncate or cuneate base.* Racemes terminal, nearly naked; pedicels filiform, strigose, *as long as calyx,* at length nodding; flowers .006 long, calyx truncate at base, slightly auricled, with triangular, acute lobes; nutlets granular at back, with denticulate margin — Spring — Wadis around the Dead Sea, and southward.

Var. **Ehrenbergii,** Post. Leaves truncate at base, pubescent between prickles. Flowers scarcely .004 long (*T. Ehrenbergii; Schweinf.*) Sinai.

2. T. Boissieri, Post. ⊙ or ♃ (Journ. Linnæan Soc., Lond., Bot. vol. xxiv. p. 436). .4 to .5, *silky-grey, somewhat pannous above;* stems ascending, corymbose-panicled above. Leaves oblong to oblong-lanceolate, entire, acutish, the lower .05 long, .02 broad, tapering to a petiole, the upper sessile, heart-shaped at base, clasping, elliptical. Racemes few-flowered, terminal; bracteoles linear-lanceolate; pedicels *twice to thrice as long as calyx,* at length nodding; flowers .02 broad; calyx-lobes lanceolate, acuminate; *outer and lower aspect of anthers densely pannous* —Spring— Ruins of Qosr-el-'Abd at 'Irâq-el-Amîr (Moab).

4. CACCINIA, Savi. Caccinia.

Calyx 5-cleft beyond middle, growing in fruit and then stellate. Corolla salver-shaped, tube longer than calyx, throat broadening suddenly, closed within by arched scales, lobes spreading, somewhat unequal, linear to oblong. Stamens inserted at apex of tube; anthers exserted, the lateral and anterior smaller, unequal, nearly sessile, the posterior longer, versatile, long-exserted. Style filiform, long-exserted, expanded at base in fruit to a membranous-crustaceous cup, enclosing nutlets. Fertile nutlets 2 or 1, flattened, ovate or orbicular, horizontal-suspended — Strigose herbs.

C. Russelii, Boiss. ② .2 to .6; stem thick, leafy, stiff branched, ending in a pyramidal thyrsus. Leaves lanceolate to linear-lanceolate, upper surface and margin tubercular-aculeate. Corolla-tube twice as long as calyx, lobes linear, obtuse; posterior anther thrice as long as the others; nutlets ovate, keeled, with flat disk, and denticulate margin — Spring — Fields and dry places; Damascus to Aleppo, and eastward. Syrian Desert (Qaryetein to Palmyra).

5. CYNOGLOSSUM, L. Hound's Tongue. *Lisân-el-Kelb.*

Calyx 5-parted. Corolla funnel-shaped, the tube nearly as long as calyx; the limb 5-lobed, spreading; the throat closed by 5 scales. Stamens included; anthers oblong. Stigma entire or retuse. Nutlets

4, flattened-ovate, roughened all over with barbed or hooked prickles, with or without a tumid margin —Herbs with petioled lower and half-clasping upper leaves, and paniculate racemes.

1. C. Nebrodense, Guss. ② .3 to .6, pubescent or hirsute; stem-leaves scattered, oblong-linear to oblong lanceolate, .05 to .1 long. Corolla *red.* Fruiting racemes *loose;* fruit generally not more than .006 to .008 broad — May to August — Mountains of Gilead, Antilebanon, Lebanon, Cassius, and northward.

2. C. pictum, Ait. ② .5 to .8, canescent with soft wool; stem-leaves crowded, oblong lanceolate, .05 to .15 long. Corolla *blue, netted-veined.* Fruiting racemes *dense,* fruit often .01 broad — May to August — Common throughout.

6. SOLENANTHUS, Ledeb. SOLENANTHUS.

Calyx 5-parted. Corolla tubular, with erect lobes. Scales obtuse, usually villous. Stamens 5, filaments inserted below middle of corolla, usually long-exserted. Anthers oblong, entire. Stigma dot-like. Nutlets 4, flattened, echinate with glochidiate prickles, concave, margined, or convex, not margined — More or less pubescent herbs, with aspect of Cynoglossum.

1. S. Tournefortii, DC. ♃ .4 to .5 appressed-velvety, *canescent,* thyrsoid above. Leaves 3-5-nerved, *nerves parallel;* the lower leaves oblong, obtuse, *tapering to a long petiole,* blade .1 to .15 long, .015 broad; stem-leaves *linear-lanceolate,* base somewhat *clasping-decurrent.* Racemes dense in flower, .05 to .1 long in fruit; calyx-lobes oblong-linear, woolly; corolla reddish-blue; filaments nearly twice as long as corolla; nutlets uniformly beset with barbed prickles with a broad base; margin distinct — May and June — Subalpine and alpine Lebanon and Antilebanon.

2. S. amplifolius, Boiss. ♃ .6 to 1, sparingly and minutely pubescent, *green;* stem stout, grooved, *ending in a broad panicle.* Leaves membranous, *netted-veined,* the radical ovate-oblong, .2 to .3 long, .1 broad, *cordate at base,* long-petioled; the upper *ovate to round-ovate,* cordate at base, obtusely auricled. Racemes .2 to .3 long in fruit; calyx-lobes linear-spathulate, hirsute; corolla blue; filaments long-exserted; nutlets with tubercular-echinate disk, and margin beset with several rows of barbed prickles with broad base — Spring — Jebel-Qulêb (Ḥaurân); Antilebanon.

7. TRACHELANTHUS, Kunze. TRACHELANTHUS.

Calyx 5-parted. Corolla somewhat longer than calyx, cylindrical, the upper half-dilated, deeply 5-lobed, lobes erect-connivent linear-oblong, obtuse, and furnished at the base of the lobes with 5, prominent, retuse gibbi. Scales oblong, elongated. Stamens 5, with broad, short filaments inserted under the throat, anthers long, linear, sagittate at base. Stigma capitate. Nutlets 4, flattened-convex, inserted on a central column, echinate-glochidiate, not margined — Tall, glabrous herbs, with large leaves, and large fruits. (*Cerinthopsis, Kotschy*).

T. cerinthioides, Boiss. ♃ .6 to 1, glabrous, glaucescent; stem stout, ending in a corymb partly concealed by upper leaves. Leaves sparingly beset with small calcareous tubercles beneath, the radical oblong, .4 to .5 long, petioled, tapering or truncate at base; the upper smaller, oblong from subcordate base. Racemes few-flowered; pedicels slender, longer than calyx; calyx-lobes elliptical, *to oblong*, obtuse or acutish; fruits .012 broad, nutlets echinate-glochidiate, with short prickles — Spring —

Kurdicus, Post. Calyx-lobes oblong-linear. Prickles of fruit longer. (*T. Kurdicus, Ky. Cerinthopsis foliosa, Paine.*)

Fig. 252.



Fruit of Trachelanthus cerinthioides. Var. Kurdicus, Post.

8. RINDERA, Pall. Rindera.

Calyx 5-parted. Corolla tubular to funnel-shaped, with upright lobes, and long or short scales inserted near base or throat of tube. Stamens more or less exserted. Stigma (in ours) dot-like. Nutlets flattened, unarmed, with a broad, flattened, entire, repand, or denticulate margin — Perennial herbs. (Includes *Cyphomattia*, *Boiss.*, and *Mattia. Schultz.*)

* *Stout-stemmed herbs, not growing in tufts.*

1. R. lanata, Lam. ♃ .15 to .5; rootstock thick, scaly; stems stout, corymbose-paniculate. Leaves firm, appressed-canescent or green, tubercled-dotted, the radical petioled, oblong, cuneate at base, those of stem oblong to lanceolate, petioled to sessile-half-clasping. Inflorescence fleecy; flowering racemes capitate, fruiting elongated; corolla *pink, at length bluish*, with 5, inflated gibbi above base, and linear-lanceolate lobes longer than tube; scales near base of corolla, oblong; stamens much shorter than corolla; pedicels about as long as fruits or longer, ascending; wings of nutlets as broad as cells or broader, orbicular, radiately plaited, entire or repand; fruit .03 in diameter; styles nearly as long as fruit — Spring — Rocky places; Aintâb, and northward. (*Cyphomattia lanata, Lam.* in Fl. Or. IV. 272).

Fig. 253.



Fruit of Rindera lanata.

* * *Tufted, alpine herbs.*

2. R. Schlumbergeri, Boiss. ♃ .06 to .1, appressed-canescent. Root-leaves ovate-oblong, spathulate, .015 to .02 long, .01 broad, tapering to a petiole; stem-leaves linear-lanceolate, sessile, tapering at base. Lower pedicels axillary, the others naked at base, all stiff, twice to thrice as long as fruit; corolla *purple*, cleft for one-sixth its length into ovate lobes; scales transversely plaited, shorter than filaments and

corolla; nutlets with denticulate margin; style longer than fruit — Spring — Alpine Lebanon. (*Mattia Schlumbergeri, Boiss.*)

9. PARACARYUM, Boiss. Paracaryum.

Calyx 5-parted. Corolla funnel-shaped, with ascending lobes. Stamens included; anthers elliptical, longer than filaments and capitate stigma. Nutlets with glabrous or tubercled disk, and inflexed or flattened, toothed margins — Herbs with aspect of Cynoglossum.

* *Nutlets with introflexed, urn-shaped or cup-shaped margins.*

† *Annuals.*

1. P. micranthum, Boiss. ⊙ *Suleisileh.* .05 to .1, in fruit .15, velvety-asperulous, greyish; stems tender, erect or ascending, few-branched. Root-leaves oblong, obtuse, the others oblong-linear. Fruiting racemes loose, one-sided; fruiting pedicels recurved as long as calyx or shorter; corolla blue, minute, limb as long as tube; nutlets .003 broad, cup-shaped with echinulate or unarmed disk, and more or less introflexed denticulate margin — Spring — Et-Tîh and Sinai.

† † *Perennials.*

2. P. rugulosum, D. C. ♃ *Um-Libbeid.* .2 to .3, canescent, often with retrorse hairs; root vertical; stems tufted. Lower leaves oblanceolate, long-tapering at base, upper lanceolate to linear. Inflorescence a stiff panicle; corolla violet to purple, limb shorter than tube; fruiting racemes loose, short; fruiting pedicels *as long as calyx or longer;* nutlets hamper-shaped, with *echinulate* or unarmed disk, and rugose, denticulate, introflexed margin — Spring — Et-Tîh, and southward to Sinai.

* * *Nutlets with slightly concave or flattened margin.*

† *Style one-fifth to one-fourth as long as nutlets.*

3. P. myosotoides, Labill. ♃ .1 to .25, with grey, appressed indument; stems ascending, simple or branching almost from base. Radical and lower leaves oblong, petioled; stem-leaves sessile, linear. Corolla violet-blue, limb shorter than tube; fruiting racemes elongated, loose; fruiting pedicels spreading-recurved, *shorter than calyx;* nutlets with echinate, rarely unarmed disk, and membranous, denticulate, rarely entire margins; style one-fifth as long as nutlet — July to October — Alpine Lebanon and Hermon; Akher Dagh, and northward.

4. P. lamprocarpum, Boiss. ♃ .3 to .7, clothed with long, white hairs tubercled at base. Leaves linear-lanceolate, the lower .06 to .1 long, .006 to .01 broad, petioled. Raceme terminal, generally bifid, or several, elongated, loose in fruit. Pedicels somewhat shorter than calyx; corolla blue, once and a half as long as calyx; scales shorter than limb, ovate, inflated and recurved at tip; nutlets *glossy, unarmed,* with broad, flat, *entire or obsoletely repand margin* —Summer — Rocks; Antilebanon and Cœlesyria.

† † *Style as long as nutlets.*

5. P. velutinum, Post. Sp. Nov. ② ? .3 or more, *appressed-velvety,* greyish-canescent. Root-leaves oblong-spathulate, tapering into a petiole several times longer than blade; stem-leaves linear-spathulate.

Racemes 1-2, from near base. Calyx-lobes linear, reflexed in fruit, nearly as long as *reflexed* pedicels; corolla *cylindrical-obconical, nearly twice as long as calyx;* scales erect, oblong, 5 times as long as short corolla-lobes; nutlets .01 long and broad, *unarmed*, *glabrous*, glossy, margin broader than cell, somewhat *concave*, *denticulate* — May — Qaldûn (Antilebanon Plateau.). Plant resembling P. Aucheri, DC., but distinguished by its appressed-velvety indument and long corolla.

10. ECHINOSPERMUM, Swartz. STICKSEED.

Calyx 5-parted. Corolla salver-shaped, throat closed by minute scales. Stamens included, anthers longer than filament. Nutlets sometimes more or less adnate to each other, erect, 3-angled or flattened; disk tubercled or smooth, margined with 1-3 rows of glochidiate prickles free or connate at base — Herbs with minute white or bluish flowers, and pyramidal fruit usually appressed-strigulose, (ours not more than .002 to .003 long).

* *Nutlets keeled, with pitted muricate surface, and indistinct margin.*

1. E. spinocarpus, Forsk. ⊙ .1, canescent or virescent, more or less branched from base. Leaves linear-spathulate, .01 to .015 long. Racemes loose; bracts linear, *longer than fruit;* pedicels *very short;* fruiting calyx *twice as long* as fruit; nutlets keeled —Spring — Deserts east and south of Syria and Palestine.

** *Nutlets with disk, and* 1-3 *rows of glochidiate prickles at distinct margin.*

2. E. barbatum, M. B. ① ② .3 to .5, *canescent*, many stemmed; stems paniculate above. Leaves *linear-spathulate to linear*, .02 to .035 long. Racemes at length much elongated; bracts *minute;* fruiting calyx *scarcely longer than fruit;* disk tubercled, margins with 2 rows of prickles — Spring — Antilebanon; Damascus plain, and northward and eastward.

3. E. Lappula, L. ① ② .3 to .4, *appressed-hirsute;* stem panicled. Leaves *lanceolate-oblong*, the radical petioled, .1 to .15 long, the cauline stiff, sessile, diminished. Racemes at length elongated; lower bracts *longer than calyx;* fruiting calyx *as long as fruit;* disk tubercled; margin with 2-3 rows of prickles — Summer — El-Jebel-el-Aḥmar (Amanus).

*** *Nutlets with one row of glochidiate prickles at margin.*

4. E. Sinaicum, D. C. ⊙ .1 to .2, hispidulous; stems slender, flexuous, simple or sparingly branched. Lower leaves oblong, tapering to a petiole, the upper oblong, sessile. Racemes few-flowered, at length loose; pedicels as long as or longer than fruiting calyx, erect or recurved; calyx-lobes linear, reflexed in fruit; corolla minute, blue; nutlets minutely tubercled — Spring — Sandy places; Sinai.

11. ECHIOCHILON, Desf. ECHIOCHILON.

Calyx 5-parted, the inner lobe smaller, often 0. Corolla-tube slender, somewhat curved, throat naked, limb spreading, 2-lipped, uppe lip obsoletely 2-lobed, lower 3-lobed. Anthers 5, subsessile, includedr Style included; stigma 2-lobed. Nutlets 4, ovate, glabrous — Low shrubs growing in sand of coast and deserts.

E. fruticosum, Desf. ♄ *Mugheirâ. Kaḥḥâleh.* .1 to .25, much branched, *with white bark*, appressed-canescent. Leaves oblong, .005 long, obtuse, closely appressed below, spreading above. Flowers solitary, nearly sessile, in .02 to .04 long spikes at end of branches — Spring — Cœlesyria; Coast from Beirût to Jaffa, and southward to Et-Tîh, Sinai, and Egypt.

12. ROCHELIA, R'chb. Rochelia.

Calyx 5-9-parted, lobes generally growing in fruit. Corolla funnel-shaped, minute, nearly equal to calyx, with obscure scales under middle of tube. Stamens 5, included, filaments very short, anthers oblong, retuse at base, with short, exserted connective at apex. Stigma capitate. Nutlets 2, rarely 1, pyramidal, generally tubercled-glochidiate — Herbs.

R. stellulata, R'chb. ⊙ .1 to .2, appressed-canescent, diffusely branching from base and above. Lower leaves orbicular to oblong-spathulate, petioled, upper oblong to linear, sessile. Fruiting racemes .05 to .1 long; bracts linear, longer than 5-lobed calyx; pedicels as long as flowering, shorter than fruiting calyx, at length deflexed; *lobes of fruiting calyx hooked-incurved, beset with hooked hairs,* twice as long as fruit; nutlets densely covered with stellate-glochidiate tubercles — Spring — Fields and sandy places.

Var. **genuina,** Post. Spreading; corymbose paniculate from base, .1 to .2 high — Fields and sandy places, Lebanon, Antilebanon to Damascus, Aleppo, and northward.

Var. **erecta,** Post. .2 to .4, stem simple below, paniculate above — Aintâb.

13. ASPERUGO, L. German Madwort.

Flowering calyx 5-cleft, lobes sinuate-dentate at base; fruiting calyx growing, flattened, with 2, broad valves, one 6- and the other 7-dentate-lobed. Corolla small, nearly as long as calyx, almost funnel-shaped, throat closed with small, obtuse scales, limb 5-lobed. Anthers included, nearly sessile, ovate, retuse on each side. Stigma capitate. Nutlets flattened laterally, pear-shaped, warty —Annual, flaccid herbs.

A. procumbens, L. ⊙ .3 to .5 retrorsely scabrous, procumbent. Leaves elliptical-oblong, radical petioled, upper tapering at base opposite or in threes or fours. Flowers short-pedicelled, 3-4 in a cluster opposite floral leaves; fruiting pedicels nodding; fruiting calyx netted-veined, with acute, ciliate lobes — April and May — Fields and roadsides; everywhere.

14. SYMPHYTUM, Tourn. Comfrey.

Calyx tubular, 5-cleft or -parted. Corolla cylindrical or funnel-shaped, with a somewhat inflated limb cleft into short, broad lobes, and furnished with long scales alternating with anthers (Fig. 251 *g*). Stamens included. Nutlets 4, free, straight, oblique or horizontally curved, excavated at the base which is surrounded by a ring — Perennial, branching herbs, stems winged by decurrent petioles; flowers (in ours) white.

1. S. Palæstinum, Boiss. ♃ .2 to .5, pale-green, pubescent-viscid, with a few bristles. Leaves ovate to ovate-oblong, round or cordate at base, .03 to .1 long, the lower long-petioled, the upper short-petioled or sessile. Calyx .015 long in fruit, lobes linear; corolla more than twice as long as flowering calyx, scales as long as anthers; nutlets *straight*, reticulate-rugose, tubercled — Spring — Hill country from Jerusalem and Es-Salt to Lebanon, Antilebanon, Nusairy Mountains, Amanus, Aintâb, Marash, and northward.

2. S. Orientale, L. ♃ .3 to .5 or more, soft-hirsute with wavy hairs; stems erect. Leaves oblong-cordate, the lower petioled, the upper sessile, all rounded or cuneate at base. Calyx .008 long in fruit, with lanceolate lobes; corolla twice as long as flowering calyx. scales a little longer than anthers; nutlets minute, smooth, *oblique*, constricted above base — Spring — Gilead and Haurân (Tristram).

15. BORAGO, L. Borage. *Lisân-eth-Thaur.*

Calyx 5-parted. Corolla rotate, tube short or 0, limb spreading, 5-lobed; scales glabrous, retuse. Filaments short, thick, furnished with an obtuse appendage beneath tip; anthers exserted, connivent in a cone. Nutlets 4, free, hollowed out at base, and surrounded by a plicate ring — Annual or perennial herbs.

B. officinalis, L. ⊙ .5 to 1, hispid-strigose; stems erect or ascending, thickish, panicled-corymbose. Lower leaves ovate, tapering to a petiole, upper sessile, oblong. Peduncles elongated, in fruit nodding at tip; calyx-lobes linear; corolla blue, .015 broad, villous within, lobes ovate-oblong, acute; scales triangular-ovate, retuse; anthers mucronate; nutlets straight, wrinkled and tubercled, 2-toothed at tip — Summer — Abeih (adventive).

16. ANCHUSA, L. Bugloss.

Calyx 5-cleft or parted, generally growing in fruit. Corolla funnel-shaped, with straight or curved, gibbous tube, throat closed by 5, obtuse, papillose scales. Stamens included. Nutlets hollow at the base, which is surrounded by a tumid, often plaited ring — Perennial or monocarpic herbs.

* *Perennials.*

† *Calyx 5-cleft. Nutlets obliquely curved.*

1. A. officinalis, L. ♃ ② .4 to .6, patulous-hispid or woolly, panicled. Leaves oblong-lanceolate to linear-lanceolate, entire or subrepand, wavy-margined. Bracts triangular-lanceolate to ovate-cordate; pedicels shorter than calyx, at length nodding; calyx campanulate, cleft for one-third to one-half of its length into lanceolate lobes; corolla blue, tube exserted; scales ovate, velvety; nutlets .002 long, minutely tubercled, more or less constricted above ring — April to August — Coast to subalpine regions; common throughout.

2. A. hybrida, Ten. ② .4 to .5, villous hispid, branching from base or above, panicled. Leaves oblong-lanceolate to oblong-linear, somewhat wavy-margined. Bracts ovate-cordate; pedicels shorter than calyx, at length nodding; calyx campanulate, cleft for

one-third to one-half its length into lanceolate lobes; corolla blue, tube exserted; scales ovate, velvety; nutlets .002 long, tubercled-wrinkled, somewhat constricted above ring — Spring — Vineyards and fields; coast and mountains to 1000 m., and tablelands.

3. A. undulata, L. ② .3 to .6, grey, tomentellous-scabrous. Leaves oblong-lanceolate to linear, wavy-margined. Bracts ovate-cordate; pedicels shorter than calyx; calyx campanulate, cleft for one-third to one half its length into triangular to lanceolate lobes; corolla blue, exserted; scales ovate, velvety; nutlets oblique, ovate, tubercled-wrinkled, *not constricted above ring* — Spring — Fields; same range as last.

The last two species would seem to be varieties of *A. officinalis, L.*

† † *Calyx 5-parted. Nutlets straight, erect.*

4. A. Italica, Retz. ♃ *Dhanab-el-Qut.* .3 to .6, *hispid with long hairs* arising from a tubercle, panicled above. Leaves oblong to oblong-lanceolate and oblong-linear, the lower petioled, the upper sessile. Pedicels erect, as long as calyx or longer; calyx-lobes linear; corolla blue, tube as long as calyx; limb .008 to .01 broad; bracts penicillate, exserted; nutlets .004 long, 3-angled, strongly wrinkled, areolæ pappulose —April to June — Common to subalpine regions.

Var. **exserta,** Post. Corolla-tube long-exserted — Jerusalem.

Var. **angustifolia,** Post. All the leaves lanceolate-linear — Marash.

5. A. strigosa, Labill. ♃ *Hamham.* .4 to .8, *exceedingly strigose with prickly hairs* arising from a tubercle, panicled above. Leaves entire or eroded-dentate, the radical obovate-oblong to oblong, petioled, the upper lanceolate to linear. Bracts as long as pedicel; pedicels shorter than calyx; calyx-lobes oblong-linear; corolla .01 to .015 broad, blue to white, *tube longer than calyx;* scales furnished with elongated papillæ; nutlets .006 long, 3-angled, ribbed — April to June — Common to subalpine regions.

6. A. Barrelieri, All. Ped. ♃ .4 to .5; stems *retrorsely hirsute, leaves spreading-hirsute;* stems bifid-panicled above. Leaves oblong to lanceolate, the lower petioled, the upper half-clasping. Bracts *scale-like, minute;* pedicels shorter than calyx; calyx-lobes linear, obtuse; corolla .003 broad, blue, tube shorter than calyx; scales semi-orbicular, glabrous, ciliate; nutlets .003 long, oblong-cylindrical, ribbed, areolæ tubercled — Spring — Marash, and northward.

† † † *Calyx 5-parted. Nutlets oblique or horizontally curved.*

7. A. neglecta, Alph. DC. ② ♃ .4 to .6, *green, tender, minutely asperulous;* stems branching from base and above. Leaves oblong to ovate and lanceolate, the lower petioled, the upper sessile. Bracts 0; pedicels spreading or reflexed, as long as fruiting calyx; calyx-lobes lanceolate, at length linear-lanceolate; corolla .003 broad, blue, *tube as long as calyx;* scales transversely ovate, velvety; nutlets .002 long, half-ovate, wrinkled-areolate. with a short, double-edged beak — April to September — Rocky places; alpine and subalpine Lebanon, Cœlesyria, Antilebanon, and Jebel-ed-Durûz to Cassius, Amanus, and northward.

* * *Annuals.*

† *Corolla-tube straight.*

‡ *Nutlets horizontal, wrinkled, short-beaked. Corolla-tube straight.*

8. A. aggregata, Lehm. ⊙ *Temalîq. Qir'î.* .3 to .5, *densely strigose*, dichotomously branched from base and above. Leaves oblong-spathulate to linear-oblong and linear, repand, the lower long-petioled, the upper sessile. Racemes *terminal, very dense, corymbose-capitate; flowers nearly sessile;* calyx-lobes at length triangular-lanceolate; corolla blue, .002 broad, tube exserted; scales exserted, oblong, penicillate; nutlets transversely .005, vertically .003, with inflated ring at base — Spring — Sands of coast and lower coast ranges, and southward to Sinai and Egypt; El-Ghôr.

9. A. hispida, Forsk. ⊙ Rough with unequal bristles arising from a tubercle; stems numerous from neck, prostrate, simple or forked-branched. Leaves remotely repand-denticulate, more or less wavy-margined, lanceolate, obtuse, the lower long-petioled. Flowers *solitary in axils, minute,* pedicels short, at length nodding; calyx-lobes lanceolate, *at length spreading;* corolla tubular, *violet,* not longer than calyx, limb minute, scales papillose, obtuse; nutlets transversely ovate, nearly horizontal, with an acute-angled beak, areolate, minutely tubercled — Spring — Sinai.

10. A. Aucheri, Alph. DC. ⊙ .08. to .15, green, strigose, branching from base, diffuse. Leaves oblong to linear-oblong, somewhat repand, tapering at base, the lower petioled, the floral elliptical, longer than flowers. Flowers axillary, forming short, dense, leafy racemes; pedicels *shorter than calyx,* at length nodding; calyx-lobes lanceolate; corolla *pinkish-blue,* scarcely longer than calyx, .005 long, .002 broad; scales oblong, exserted, velvety; nutlets transversely .004, vertically .002, areolæ minutely tubercled — Spring — Hermon to Cassius, Amanus, and northward.

‡ ‡ *Nutlets oblique, wrinkled-netted, acute. Corolla-tube straight.*

11. A. Ægyptiaca, L. ⊙ *Shubeit. Dabbûn.* .3 to .6, pale green, *warty, strigose,* diffuse, prostrate or ascending, dichotomous. Leaves repand-dentate, oblong to oblong-lanceolate, tapering at both ends. Racemes *very loose,* leafy; pedicels *extra axillary,* as long as or longer than calyx, *usually recurved in fruit;* calyx-lobes lanceolate, twice as long as nutlets; corolla *yellow,* tube *shorter* than calyx, limb .002 broad, scales exserted, velvety; nutlets .005 long, .003 broad — Spring — Walls and waste places; common.

12. A. Milleri, Willd. ⊙ *Kaḥalâ. Turr.* .3 to .5, *loose-hispid, not warty,* diffuse or erect, branching from base. Leaves repand, oblong, tapering at both ends, the lower petioled. Flowers *at or above axils,* forming loose, leafy racemes; pedicels as long as or longer than calyx, *straight;* calyx-lobes *linear,* twice as long as nutlets; corolla *pinkish-white,* tube about *twice as long* as calyx, limb .002 broad, scales exserted, glabrous at tip; nutlets .003 long, .0015 broad — Spring — Borders of et-Tîh; el-Ghor; Gilead; Palmyrene desert.

13. A. Palmyrensis, Post. (Pl. Postian. Fasc. IV.) ⊙ .15 to .2, pubescent, viscidulous, branching from base; stems ascending. Leaves .02 to .05 long, .003 to .006 broad, linear to oblong, tapering at both ends, the lowermost petioled. Flowers at axils or above, forming leafy racemes at first dense then loose; flowering pedicels *one-third to one-half as long as* calyx, fruiting pedicels as long as the enlarged calyx; calyx-lobes lanceolate-linear; corolla yellowish-pink, tube .01 long, *a little longer than calyx;* scales *minute, pubescent;* nutlets transversely ovate, black, smooth, glossy, keeled at back, obliquely beaked —April — Palmyrene Desert and ruins of Palmyra.

14. A. Shattuckii, Post. ⊙ (Joun. Linn. Soc. Bot. XXIV, p. 435). .08 to .15, *erect hispidulous*, forked above. Leaves entire, sessile, oblong, *obtuse*, the lower tapering at base. Flowers few, in *rather dense*, terminal racemes; pedicels *shorter* than calyx, *deflexed in fruit;* calyx-lobes linear, *scarcely longer than nutlets;* corolla (dried) *blackish-brown*, tube twice as long as calyx; scales exserted; (immature) nutlets tubercled at outer face — Spring — Fields; Aintâb and Marash.

† *Corolla-tube curved. Nutlets transversely ovate.*

15. A. Tiberiadis, Post. ⊙ .3 to .5, sparingly rough-setulose, erect, corymbose-paniculate. Leaves oblong to lanceolate, repand-dentate, the lower tapering to a petiole, obtuse, the upper sessile, *half-clasping*, acute. Racemes at first crowded, then loose; bracts *ovate-lanceolate*, *a little longer than pedicels;* calyx growing little, lobes linear-lanceolate, twice as long as nutlets; corolla *yellow*, tube as long as calyx, curved about middle; nutlets wrinkled, tubercled, .002 long, .0015 broad, *short-beaked*, ring at base rugose -- Spring -- Tiberias (Armitage).

17. NONNEA, Medic. NONNEA.

Calyx 5-cleft. Corolla funnel-shaped or tubular, straight, with hairy or fringed squamules near middle of tube. Nutlets 4, free, with concave base, surrounded by a tumid, often plaited ring -- Prostrate or ascending herbs.

* *Nutlets straight or somewhat gibbous, with erect beak.*

1. N. obtusifolia, Willd. ⊙ .2 to .4, *prostrate, flaccid*, green, rough with short hairs. Leaves obovate-oblong to oblong, nearly entire, the lower tapering at base, the upper clasping, somewhat decurrent. Flowers axillary, forming short, leafy racemes; calyx cleft *to middle;* corolla bluish-white; nutlets black, *shining*, *puberulent*, *not plaited* -- Spring -- Waysides and shady places; common.

** *Nutlets transversely ovate or oblong, with lateral beak directed inwards.*

2. N. melanocarpa, Boiss. ⊙ .2 to .3, *erect* or *decumbent*, asperulous with unequal hairs. Leaves entire, the lower oblong-lanceolate, tapering at base, the others elliptical with subcordate base; floral *triangular-lanceolate*, acuminate, longer than flowers. Racemes leafy, at length loose; calyx cleft nearly to middle; corolla *reddish or pale violet;* nutlets black, puberulent, *netted*, *basilar margin plaited* — Spring — Jerusalem; Haurân to Palmyra, Aleppo, and eastward.

3. N. Philistæa, Boiss. ⊙ .2 to .3, decumbent, puberulent-viscid, and rough with tubercled hairs. Leaves lanceolate-oblong, tapering at base, the floral triangular-acuminate longer than flowers. Racemes leafy, *rather dense in fruit;* calyx cleft for one-third its length; corolla *pale orange;* nutlets obsoletely puberulent, *netted-veined, basilar margin plaited, dentate* — Spring — Philistine Plain; Beersheba. (*Too near the last*).

* * * *Nutlets reniform, horizontal, obtuse, attached by middle of sinus.*

4. N. ventricosa, S. et S. ⊙ .1 to .4, asperulous with short wool and scattered hairs. Leaves oblong to oblong-linear, obtuse, the radical tapering at base. Raceme terminal, simple or bifid; calyx cleft for *one-fourth* its length; corolla *white*, minute; nutlets slightly netted-plaited — Spring — Coast; Cœlesyria; eastern tableland from el-Balqâ to Damascus, and northward.

18. ALKANNA, Tausch. ALKANET.

Calyx 5-parted. Corolla regular, funnel-shaped, not plaited at throat but with small, transverse, glabrous, sometimes obsolete wrinkles at the naked throat, and a small, glabrous, ring-shaped nectary at base. Stamens whorled or spirally inserted near middle of tube; anthers nearly sessile, included. Stigma capitate or bilobed. Nutlets 4, or by abortion 2-1, warty or pitted-wrinkled, either slightly curved, with a horizontal beak, and broad, basilar sinus, or strongly curved with a nearly vertical beak, and narrow, basilar sinus; the areola flat, often stipitate at base or toward middle of sinus. Pericarp brittle; seed curved — Herbs, often with shrubby base, and colored roots.

* *Nutlets wrinkled-scrobiculate or reticulate.*

† *Flowers blue.*

1. A. strigosa, Boiss. ♃ .2 to .3, strigose-canescent, branching from base and above. Leaves linear, .01 to .04 long, obtuse or acutish, with lower mid-rib prominent, the upper leaves somewhat clasping. Bracts longer than calyx; calyx growing but little in fruit; corolla *nearly twice* as long as calyx, limb .004 broad; nutlets .003 broad, *areola sessile* — Spring — Jerusalem to Moab, Gilead, northern Palestine, Damascus, and Aintâb.

Var. **major,** Post. Leaves .05 to .08 long, .006 to .008 broad. Plant stouter and more strigose — Aintâb.

2. A. Syriaca, Boiss. et Hoh. ♃ .2 to .35, viscidulous with short wool intermixed with spreading hairs; stems erect or ascending. Lower leaves linear, acute, upper and bracts broader at base, somewhat clasping, lanceolate, acute. Bracts longer than calyx; fruiting calyx enlarged, at length deflexed, lobes lanceolate-subulate; corolla-tube *only a little* longer than calyx, limb .005 broad; nutlets .003 broad, *areola stipitate* — May and June — Aleppo to Aintâb, and northward.

3. A. Shattuckia, Post. (Sp. nov.) ♃ .15 to .3, *velvety-canescent with short wool, intermixed with villi;* stems ascending, branched above. Lower leaves linear-lanceolate, tapering to a petiole, upper cordate-clasping at base, oblong-lanceolate, .02 to .03 long, obtuse or acutish.

Bracts longer than calyx; calyx appressed-hispid, lobes linear-lanceolate; corolla deep blue, .01 broad, *tube shorter than calyx;* nutlets * * — June — Amanus. (*A. megacarpa, Alph. DC. var. Shattuckia, Post.* Journ. Linn. Soc. Bot. vol. XXIV. p. 436).

4. A. tinctoria, L. ♃ .2 to .4, velvety, intermixed with strigose bristles, grey or canescent, branching from base. Leaves oblong to oblanceolate, obtuse, .01 to .03 long, dilated and half clasping at base. Racemes at length elongated; bracts longer than the enlarged, fruiting calyces; corolla-tube a little longer than calyx, limb .003 broad; nutlets .002 broad, areola somewhat stipitate — Spring — Sands along coast.

† † *Flowers yellow.*

‡ *Nutlets little curved. Basilar sinus broad, horizontal.*

5. A. hirsutissima, Alph. DC. .15 to .2, viscid-pubescent and hispid, canescent, many-stemmed. Leaves linear-lanceolate, acute. Bracts longer than calyx; fruiting calyx enlarged, lobes lanceolate, tapering; corolla *sweet smelling*, tube a little longer than calyx, limb broad; nutlets large, with keeled, somewhat deflexed beak — Spring— Aintâb, and eastward and northward.

6. A. Orientalis, L. ♃ *Libbeid.* .4 to .5, *glandular-pubescent*, with intermixture of bristles tubercled at base; stems stout, ascending. Leaves oblong to oblong-lanceolate, the lower often .1 long, petioled, the upper half-clăsping, *all more or less repand or wavy margined.* Bracts rounded or cordate at base, *ovate*, twice as long as calyx; calyx-lobes lanceolate, enlarging somewhat in fruit, at length deflexed; corolla-tube twice as long as calyx, limb .003 to .005 broad; nutlets pitted, .002 broad, with somewhat recurved beak — Spring — Subalpine and alpine Lebanon and Hermon, and Cœlesyria; Sinai; Jordan Valley (Tristram).

Var. **integrifolia,** Post. Leaves entire, not wavy-margined. Corolla .016 long, .008 broad. Nutlets .003 broad — El-Kufr, at foot of Jebel Qulêb (Ḥaurân).

‡ ‡ *Nutlets curved; basilar sinus narrow; beak deflexed.*

7. A. Kotschyana, DC. ♃ ② .3, asperulous-canescent, intermixed with short bristles; stems ascending, bifid or sparingly branched. Leaves obtuse, the lower oblong-spathulate, long-tapering at base, the upper half clasping. Bracts much longer than calyx, *linear, obtuse;* calyx-lobes lanceolate, acuminate; corolla-tube *rusty-red*, nearly twice as long as calyx, limb .002 broad; nutlets large, areola substipitate — Spring — Hermon; Northern Syria, and northward.

8. A. Galilæa, Boiss. ♃ .3 to .4, short-velvety with intermixture of spreading hairs, especially at upper part of plant; stems ascending-procumbent. Leaves oblong-lanceolate to oblong and ovate. Bracts much longer than calyx, often .025 long, *oblong to ovate*, cordate at base; calyx-lobes lanceolate, .01 to .014 long, enlarged in fruit, not connivent; corolla-tube little longer than calyx, limb .004 broad; nutlets .005 broad, areola near base — Spring — Waste fields; Nazareth to Tiberias.

* * *Nutlets beset with warts not confluent at base. Flowers blue.*

9. A. macrophylla, Boiss. et Held. ♃ .2 to .6, ciliate-villous; stems ascending, brittle. Leaves .06 to .1 long, velvety with small bristles intermixed, oblong-lanceolate, tapering at base, the upper cordate-oblong, rather obtuse. Bracts longer than calyx; calyx nodding in fruit, not much enlarged, lobes linear-lanceolate; corolla-tube twice as long as calyx, *with five purple bands within*, limb .008 broad; nutlets small, somewhat keeled, beak nearly horizontal; areola oval, occupying the whole base — Spring — Subalpine Lebanon, Nusairy Mountains, and northward.

19. MYOSOTIS, L. FORGET-ME-NOT. SCORPION-GRASS.

Calyx campanulate, 5-cleft or parted. Corolla salver-shaped or funnel-shaped; scales at throat, obtuse; limb flat or concave, lobes twisted to the left in bud. Stamens included; filaments short, anthers oblong, inserted by middle of back, with membranous or callous point. Stigma obtuse, somewhat 2-lobed. Nutlets smooth, ovate to oblong, somewhat flattened, areola basilar-lateral with somewhat elevated margin — Perennial or monocarpic herbs, with small blue or whitish flowers.

* *Hairs of calyx appressed, not hooked at tip. Perennials.*

1. M. palustris, With. ♃ .2 to .4, *appressed-hairy*, root-stock sometimes stoloniferous. Leaves oblong to oblong-linear, the lower tapering at base, the upper acutish. Calyx-lobes half as long as tube, campanulate; corolla-limb flat, longer than tube; style as long as calyx; fruiting pedicels horizontal; nutlets ovate, glossy — Spring — Ḥaifa (Armitage).

* * *Hairs of calyx hooked at tip, spreading.*

† *Perennials or biennials.*

2. M. sylvatica, Hoffm. ② .1 to .35, many-stemmed from base, hispid, especially below, sparingly branched above. Leaves soft-hirsute, the radical oblong-spathulate, petioled, those of stem oblong-lanceolate. Racemes often bifid, loose in fruit; pedicels once to twice as long as fruiting calyx; calyx-lobes erect, not connivent in fruit; corolla .006 to .008 broad, tube as long as calyx — May and June — Shady places; Kurd Dagh; Marash.

* * *Annuals. Tender, green herbs.*

3. M. hispida, Schlecht. ⊙ *Lisân-eth-Thaur.* .1 to .4, hispid with spreading, *straight* hairs, branching from base. Leaves oblong, the radical tapering to a petiole. Raceme elongated, naked in fruit; pedicels *spreading*, about as long as calyx; corolla .0015 broad — Spring — Hillsides and grassy places, Sinai, Jebel-ed-Durûz, Lebanon, Antilebanon, Nusairy Mountains, Aleppo, and northward and eastward.

4. M. stricta, Link. ⊙ .1 to .25, hispid with short, *often hooked* hairs. Leaves oblong, obtuse, the radical rosetted, short-peduncled. Raceme leafy below; pedicels *stiff, erect, shorter than calyx; calyx closed in fruit;* corolla .002 broad — Spring — El-Jebel-el-Gharbi.

5. M. refracta, Boiss. ⊙ .05 to .25, hispid with spreading or retrorse hairs, branching from neck and above. Leaves oblong-spathulate to oblong and oblong-lanceolate, the lower short-petioled. Racemes naked, much elongated in fruit, flexuous, one-sided, loose; pedicels much shorter than calyx, *refracted and pyriform-club-shaped in fruit;* corolla .001 broad — Spring — Stony places; Alpine and subalpine Lebanon, Antilebanon, and Jebel-el-Durûz, to Cassius, Amanus, Aintâb, and northward.

20. LITHOSPERMUM, L. Gromwell. Puccoon.

Calyx 5-parted. Corolla funnel-shaped, with throat naked or pervious, or furnished with velvety, longitudinal folds between the stamens. Anthers included; filaments very short. Nutlets triangular, wrinkled-tubercled, or ovate, glabrous; areola flat, basilar — Herbs or shrubs.

* *Annuals. Nutlets ovate-triquetrous, tubercled or pitted-tubercled.*

1. L. arvense, L. ⊙ *Ghabashî.* .2 to .4, appressed-strigulose, green; stems branching from base, *erect or decumbent.* Leaves obovate to oblong, oblong-lanceolate, and linear, the lower tapering to a petiole. Fruiting pedicels *little thickened;* corolla white, rarely bluish; nutlets pitted, acutely tubercled — Spring — Common everywhere.

2. L. Sibthorpianum, Griseb. ⊙ .2 to .3, appressed-strigulose, canescent, *prostrate,* branching from base. Leaves narrow, lanceolate. Fruiting pedicels very short, *scarcely thickened;* corolla white, rarely bluish; nutlets pitted, acutely tubercled — Spring — Shetûrah; Cedars; Qaldûn (Antilebanon). Hardly distinguishable from the last.

3. L. incrassatum, Guss. ⊙ .2 to .4, appressed-strigulose, green; stems branching from base, erect or decumbent. Leaves obovate to oblong and linear, the lower tapering to a petiole. Fruiting pedicels *thickened;* corolla blue, rarely white; nutlets pitted, *slightly tubercled* — Spring — Subalpine Lebanon, Antilebanon, and Jebel-ed-Durûz, and northward and eastward.

4. L. tenuiflorum, L. ⊙ .1 to .5, strigulose-hispid, often yellowish, branching from base. Leaves oblong-spathulate petioled, to oblong-linear sessile. Pedicels very short, *unchanged in fruit;* corolla blue, rarely white; nutlets .002 long, *tubercled, not pitted, with two lateral gibbi and a short beak* — Spring — Jerusalem and coast, to Cœlesyria, Antilebanon, Damascus, Aleppo, Aintâb, and northward.

5. L. Apulum, L. ⊙ .2 to .3, hirsute with tubercled bristles; stem rigid, rather simple. Leaves linear, 1-nerved, the radical somewhat spathulate, the cauline stiff. Racemes *somewhat corymbose, dense in fruit, bracteate; corolla yellow;* nutlets glossy, tubercled, gibbous — Spring — Aintâb, and northward.

* * *Perennial herbs. Nutlets ovate, perfectly smooth, corolla plaited within.*

6. L. purpureo-cæruleum, L. ♃ .5 to .6, appressed hirsute, with creeping root-stock, and erect stalks, 2-3-forked at apex. Leaves oblong-lanceolate, acute, tapering at base. Calyx-lobes long-tapering, linear; corolla *purple,* .015 long, .01 broad; nutlets white, .0035 long, .0025 broad, glossy — Summer — Amanus, and northward.

* * * *Shrubs. Nutlets ovate-triquetrous, nearly smooth. Corolla naked within.*

7. **L. callosum,** Vahl. ♄ *Jureibi. Halameh.* .15 to .2, *very strigose with appressed, unequal prickles,* canescent. Leaves .01 to .02 long, *subsessile at base,* with callous margins. Racemes short, *spike-like,* loose in fruit; corolla-tube *twice and a half to thrice* as long as very strigose calyx; throat hirtulous; nutlets .001 long, ovate-triangular, brownish, glossy, tubercles 1-2 or 0 — Spring — Gaza to borders of Et-Tîh, and southward.

8. **L. hispidulum,** S. et S. ♄ .3 to .5, appressed-hairy, intricately branched, branches dry, rather persistent. Leaves olive-green, *oblong,* .01 to .02 long, *tapering at base, short-petioled.* Flowers 1 to 4, *crowded among upper leaves,* sessile; corolla *hardly twice as long* as appressed-hairy calyx, throat glabrous; nutlets .001 long, ovate-triquetrous, white, glossy, minutely tubercled — Spring — Lower spurs of Cassius, Amanus, and northward.

21. MOLTKIA, Lehm. Moltkia.

Calyx 5-parted. Corolla cylindrical below, inflated-funnel-shaped above, with straight lobes and naked throat. Filaments long-exserted; anthers oblong, curved, inserted near their base on the filament. Style filiform, acute. Nutlets straight or somewhat incurved, ovate-triangular or angled, areola basilar, flat — Shrubs, with showy corymbs of blue flowers.

M. cœrulea, Willd. ♄ .15 to .25, many-stemmed, canescent, scabrous with appressed, tubercled hairs; stems erect, stiff, densely leafy below, corymbose above. Root-leaves oblong-spathulate, obtuse, tapering at base; stem-leaves sessile, stiff, linear-lanceolate, acute, .015 to .025 long, .002 to .004 broad. Racemes 2-5, at first scorpioid, then straight, stiff; corolla blue, sparingly setulose, four times as long as calyx, .015 long, tube slender, limb abruptly bottle-shaped; nutlets white, obsoletely wrinkled, minutely depressed-punctate, incurved, with a short, horizontal beak — April — Hillsides and waste places; Antioch to Palmyra, Aintâb, and northward and eastward.

Var. **subcristata,** Boiss. Nutlets coarse-tubercled, wrinkled, somewhat crested — Same range as type.

22. ARNEBIA, Forsk. Arnebia. *Shajaret-el-Arnab.*

Calyx 5-parted. Corolla funnel-shaped, with elongated tube, a nectar-like ring at its base, and a naked throat, and spreading limb. Anthers inserted on tube, included. Style bifid, branches often bilobed. Nutlets triangular, acute, tubercled or scrobiculate-wrinkled, rarely smooth—Annual, desert herbs, with yellow or pale violet flowers.

* *Fruiting calyx scarcely growing,* .005 *long. Corolla yellow.*

1. **A. hispidissima,** Spreng. ⊙ *Attahn.* .2 to .3, strigose with tubercled hairs, branching from base. Leaves lanceolate to linear. Racemes one-sided, dense; calyx-lobes narrowly lanceolate; corolla-tube .012 long, twice as long as calyx; stigmas flattened; nutlets tubercled, minute — Spring — Et-Tîh, and southward.

* *Fruiting calyx growing; tube crested or tubercled. Corolla yellow.*

2. A. cornuta, Ledeb. ⊙ .1 to .4, erect, hispid with appressed, and yellowish spreading hairs; stem usually branching from base. Lower leaves linear-oblong, upper linear-lanceolate, acute. Fruiting racemes *elongated, loose;* bracts as long as calyx, or longer; base of fruiting calyx indurated, *pentagonal, gibbous, crested at angles, lobes linear, connivent;* corolla .01 to .02 long, tube hirsute, once to twice as long as calyx; stigma 2-4-cleft; nutlets .001 long, *unequally tubercled* — Spring — Deserts from Et-Tîh and Jericho to Palmyra, Aleppo, Aintâb, and northward and eastward.

3. A. linearifolia, DC. ⊙ *Kaḥalî. Hinâ-el-Ghûl. Teḥalîq.* .05 to .1, strigulose with yellow, appressed and spreading hairs; stems branching from neck. Root-leaves oblong-spathulate, somewhat petioled; stem-leaves oblong-linear, obtuse. Fruiting racemes *short, dense;* bracts linear, somewhat shorter than calyx; fruiting calyx growing much, inflated, scarcely indurated at base, *tubercled and hairy along prominent nerves,* lobes often .02 long, linear-lanceolate, 3-nerved; corolla-tube *villous,* once-and-a-half as long as calyx; nutlets .002 long, *scrobiculate-tubercled* — Sands; Et-Tih to Palmyra, and northward and eastward.

* * * *Fruiting calyx growing, tube not crested or tubercled, lobes elongated.*

4. A. tinctoria, Forsk. ♃ *Shajarat-el-Arnab.* .04 to .06, cinerascent with appressed, tubercled hairs; stem branching from base. Leaves oblong-lanceolate, obtuse, tapering at base. Fruiting racemes dense, short, *one-sided;* bracts linear, somewhat longer than calyx; calyx hirsute, lobes linear, .01 long, somewhat 3-nerved; corolla-tube *glabrous,* pale *violet,* not longer than calyx; stigma 4-cleft; nutlets *smooth,* glossy — Spring — Et-Tîh, and southward.

23. ECHIUM, L. Viper's Bugloss. Echium.

Calyx 5-parted. Corolla funnel-shaped or tubular-obconical, with spreading, naked throat, and a more or less bilabiate, 5-lobed limb. Stamens unequal, filaments long, anthers ovate, inserted by back. Style long, filiform. Nutlets 4, free, inserted on a flat, triangular areola at base of calyx, ovate, triquetrous, or pyramidal-tetragonal tubercled-wrinkled — Perennial or monocarpic herbs.

* *Stamens exserted.*

† *Corolla flesh-colored, not more than .013 long.*

1. E. Italicum, L. ② .5 to 2, or more, ashy or yellowish, bristly-hispid, *ending in a spreading or somewhat thyrsoid panicle,* .3 to .8 long. Leaves appressed-bristly, linear-lanceolate, the radical tapering to a petiole, the floral long-acuminate, *shorter than bifid racemes.* Racemes loose, spreading in fruit; calyx-lobes lanceolate, densely setose; corolla .013 long, twice as long as calyx — May to July — Fields and waste places; Syrian coast and interior plains.

2. E. glomeratum, Poir. ② .6 to 2, or more, ashy; stem simple, bristly-hispid and pubescent, *ending in an interrupted spike .3 to 1 long.* Leaves appressed-setose, the radical lanceolate, tapering into a petiole,

the floral linear-lanceolate, *longer than dense, short, sessile spikelets.* Spikelets often .1 to .13 long in fruit, *horizontal, 2-ranked;* calyx-lobes strigose, lanceolate; corolla .01 long, a little longer than calyx — May to July — Common throughout to subalpine regions.

† † *Corolla red, white, or blue,* .013 *to* .02 *or more in length.*

3. E. sericeum, Vahl. ♃ *Sâq-el-Hamâm. Lisân-el-'Asal.* .2 to .4, canescent with minute, appressed wool, and (in type) appressed bristles; *stems decumbent or prostrate.* Leaves broad-linear, the lower tapering to a petiole, margin usually involute, sometimes wavy; the floral triangular-lanceolate. Spikes panicled, at length .2 to .3 long; calyx-lobes linear; corolla *red, drying blue,* .02 to .025 long, twice and a half as long as calyx; nutlets .003 long, grey, wrinkled-tubercled, pyramidal-beaked — October to May — Sandy places; Et-Tîh, and southward.

Var. **diffusum,** Boiss. Stems diffuse, as in type, but bristles *spreading, not appressed* — Sandy places; common along coast.

Var. **hispidum,** Boiss. .4 to .8; *stems erect or ascending, hispid to strigose, bristles, even of leaves, spreading* — Sandy places; coast and interior.

4. E. longifolium, Del. ⊙ .3 to .6, stems herbaceous, pubescent, and hispid with long hairs, branching. Leaves pale-green, the radical lingulate, .1 to .2 long, long tapering at base, the cauline and floral linear. Spikes terminal, at length elongated and loose; calyx white-bristly, lobes linear-lanceolate; corolla funnel-shaped, violet, thrice as long as calyx; stamens little exserted; nutlets tertragonal-conical, sparingly tubercled-wrinkled, echinate — Spring — Fields; Sinai to Egypt.

Var. **nanum,** Post. .15 to .25. Indument strigose — Et-Tîh.

5. E. Rauwolfii, Boiss. ⊙ *Keḥeilâ. Hinâ-el-Ghûl. Kûdah.* .3 to .6, *strigose with stiff, white bristles;* stems erect, panicled above. Lower leaves linear-spathulate, tapering to a long petiole, the upper linear, the floral as long as calyx or longer. Calyx-lobes strigose, lanceolate, unequal; corolla *white or pale pink,* .012 to .015 long, irregularly campanulate; stamens little exserted; nutlets .003 long, greyish-white, obsoletely tubercled, glossy — Spring — South end of Dead Sea, and southward to Sinai and Egypt.

6. E. plantagineum, L. ② .3 to .6, appressed-stellate-tomentellous, with spreading, tubercled hairs intermixed; stems erect or ascending, loosely panicled. Radical leaves .1 long, *ovate to oblong,* tapering to a petiole, *feather-veined;* cauline oblong, half-clasping; floral oblong-lanceolate, *cordate at base.* Spicules peduncled; corolla *violet,* .02 to .03 long, *three to four times as long as calyx,* limb expanded; stamens sometimes little exserted; nutlets .003 long, rough-tubercled, keeled, bigibbous — Spring — Fields and roadsides; common to subalpine regions.

* * *Stamens included.*

7. E. arenarium, Guss. ⊙ ② hirsute with appressed or spreading hairs; stems ascending or prostrate, simple or branched. Root-leaves oblong-spathulate, obtuse, tapering to a petiole, cauline sessile, somewhat dilated at base, half-clasping, lanceolate. Spikes at length elongated, loose; bracts *oblong-subcordate;* lower flowers often outside of axils; calyx strigose, *almost unchanged*, lobes lanceolate, obtuse; corolla .008 long, tubular-obconical, hirtulous, nearly twice as long as calyx; nutlets *acuminate*, acutely tubercled, .002 long—Spring — Sands; Phœnician coast (Tristram).

8. E. calycinum, Viv. ⊙ .3 to .4, strigulose with appressed and spreading bristles; stems ascending and prostrate, ending in a simple, rarely branched spike. Root-leaves rosetted, oblong to oblong-spathulate, tapering to a petiole; stem-leaves oblong to linear-lanceolate, sometimes half-clasping. Lower flowers often out of axils; calyx .005 *long in flower*, .01 *long in fruit, hispid;* corolla .008 long, blue, hirtulous, limb scarcely spreading, nutlets .0015 long, pyramidal, rough-tubercled—Spring—Sandy places; Beirût; Aleppo.

24. ONOSMA, L. ONOSMA.

Calyx 5-parted or 5-cleft. Corolla tubular or club-shaped, regular, with naked throat, 5 teeth, and a nectariform, lobuled scale at inner aspect of base. Filaments adnate to middle of tube, more or less free above. Anthers sagittate at base, membranous-tipped, often coherent. Style long, stigma bilobed. Nutlets straight, triquetrous-ovate to oblong, glossy or tubercled-scrobiculate; basilar area flat — Herbs or shrubs, often changing color after flowering.

* *Bristles of leaves arising from glabrous tubercles.*

† *Biennials. Nectary hispid.*

1. O. Aleppicum, Boiss. ② .5 to .6, *exceedingly strigose*, with spreading, .003 long bristles, and puberulent; stems stiff, panicled. Leaves oblong-linear to linear-lanceolate, the lower tapering to a petiole. Racemes nodding in flower, erect and loose in fruit, few-flowered; calyx .02 long in fruit, lobes linear, tapering; corolla white, one-fourth longer than calyx; anthers exserted at tip, as long as their filaments; nutlets .007 long, tubercled—April to June—Wilderness of Judea and Gaza to Lebanon, Cœlesyria, Damascus, Antilebanon, Aleppo, Aintâb, and northward and eastward.

O. echioides, L., said by Tristram to be found in Moab and Gilead, is doubtless this species.

† † *Perennials. Nectary glabrous. Anthers free or coherent at base.*

‡ *Hairs of leaves and stems appressed.*

2. O. sericeum, Willd. ♃ .3 to .5, often yellowish; branches procumbent, the sterile densely leafy, the fertile sparingly so, ending in a simple or bifid raceme or few-flowered panicle. Lower leaves petioled, obovate-spathulate, upper oblong-lanceolate to lanceolate, sessile. Calyx-lobes 5, or by adhesion 4-3, .015 to .02 long in fruit, oblong-linear, indurated at base, keeled-gibbous; corolla cream-colored,

velvety at apex, one-third to one-fourth longer than calyx, club-shaped ; filaments shorter than included anthers ; nutlets .005 long, *smooth*, glossy—May to July—Dry places ; subalpine Lebanon, Antilebanon, and Jebel-ed-Durûz to Cassius, Amanus, Aleppo, Aintâb, Marash, and northward and eastward.

Var. **flavum,** Post. Generally yellowish. Nutlets more or less scrobiculate-tubercled. (*O. flavum, Lehm.*)—Same range as type.

‡ ‡ *Hairs of leaves appressed or spreading, of stems and inflorescence spreading.*

3. O. frutescens, Lam. ♃ 3. to .5, branching from base and above ; stems leafy, flexuous. Root-leaves oblong-spathulate, stem-leaves oblong to linear and linear-lanceolate. Racemes 1-3, terminal, capitate, little elongated in fruit ; calyx-lobes .01 long in fruit, lanceolate-linear, connivent ; corolla glabrous or puberulent, yellow, *often drying purplish*, one-third longer than calyx ; anthers somewhat exserted, longer than filaments ; nutlets .004 long, ovate, smooth, glossy — May to September — Rocks; coast and middle mountain zone, and inland plains; top of Mt. Cassius.

Var. **tuberculata,** Post. Nutlets finely tubercled — Zaḥleh; Palestine. (Perhaps *O. strigosissimum, Boiss.*).

4. O. Cassium, Boiss. ♃ .5 to .8, stems ascending, simple, leafy, sparingly bristly. Leaves green, sparingly beset with small bristles, otherwise glabrous, oblong, obtuse, the upper half-clasping. Racemes few, terminal, corymbose-paniculate, elongated in fruit; fruiting calyx *pedicelled*, .012 long, erect, with linear lanceolate lobes; corolla glabrous, yellow, one-third longer than calyx; anthers slightly exserted, with very short filaments; nutlets .004 long, ovate, keeled, acute, glossy, marbled — Summer — Middle region of Cassius and Amanus.

* * *Bristles of leaves arising from stellate-hairy tubercles.*

† *Perennials;* .15 *to* .3 *high.*

5. O. molle, DC. ♃ .2 to .5, tufted, *pannous-canescent*, the terminal bristle scarcely longer than the stellate hairs, closely appressed. Leaves *broad-linear*, radical .08 to .15 long, long-petioled, cauline sessile. Racemes 1-3, terminal, in fruit .15 to .2 long, rigid; calyx-lobes lanceolate, .01 long in flower, .014 in fruit; pedicel short, thick; corolla .02 to .025 long, cream-colored, velvety, one-third longer than calyx to twice as long; anthers included, twice as long as filament; nutlets ovate-triangular, acute, smooth, spotted — El-Jebel-el-Abiaḍ in Syrian desert, and eastward to the Euphrates.

6. O. albo-roseum, F. et M. ♃ .15 to .25, stellate-pannous and appressed-setose, not very strigose. Radical-leaves spathulate, petioled, cauline oblong-linear. Racemes capitate, calyx woolly or hispid, *lobes linear-lanceolate*, .018 long; corolla *pruinose*, .02 long, club-shaped, .008 broad at tip, *white*, *becoming red*, *then blue*, one-third to one-half longer than calyx; anthers included; nutlets .005 long, oblong-ovoid, glossy, smooth or obsoletely wrinkled — May to July — Rocks; Dervent to Amanus, Aintâb, and northward and eastward.

Var. **longicalyx,** Post. Calyx .025 to .03 long.

7. O. cærulescens, Boiss. ♃ .15 to .3, grey, stellate-woolly and bristly, scarcely strigulose. Radical and lower leaves oblong-spathulate, petioled, upper cauline oblong, obtuse. Racemes capitate; calyx hispid, lobes linear, .015 to .018 long; corolla *glabrous*, .015 to .02 long, *white, then bluish, one-fourth longer than calyx;* nutlets .004 long, oblong-triangular, acute, smooth, glossy — April to July — Subalpine and alpine Antilebanon.

8. O. Rasheyanum, Boiss ♃ .15 to .2, *pale-green, strigulose.* Radical leaves oblong-spathulate, petioled, cauline elliptical-linear, sessile; floral leaves linear-lanceolate. Racemes capitate; calyx hispid, lobes linear, acute, .015 long; corolla *pruinose-velvety*, white, then bluish, *one-third* longer than calyx; nutlets .004 long, oblong, tapering, smooth, glossy — April and May — Antilebanon. Too near the last.

9. O. Roussæi, DC. ♃ .15 to .2, many-stemmed from base, green, strigulose. Radical leaves oblong-spathulate, petioled, cauline oblong-linear. Racemes capitate, somewhat elongated in fruit, calyx hirsute, lobes .01 long, *linear;* corolla velvety, *cream-colored, turning red, twice as long* as calyx, .02 long, .006 broad; nutlets .003 long, 3-angled, abruptly acute at apex, smooth, glossy — May and June — Subalpine Lebanon to Aleppo, Aintâb, Marash, and northward and eastward.

10. O. Armenum, DC. ♃ .15, hispidulous, canescent, many-stemmed from base; stems ascending, simple. Leaves .02 to .1 long, oblong-linear, revolute-margined, the lower obtuse, the floral acute. Racemes 2-3, terminal, capitate; calyx-lobes .01 to .015 long, linear-lanceolate; corolla fine-velvety, cream-colored, a little longer than calyx to twice as long; nutlets .002 long, triquetrous, abruptly acute at tip, smooth, glossy — May to July — Aintâb, and northward.

11. O. stellulatum, W. K. ♃ .15 to .3, many-stemmed from base, scabrous with appressed and spreading bristles and stellate wool. Radical leaves spathulate-oblong, cauline linear-oblong, flat or revolute-margined. Racemes capitate in flower, *elongated in fruit;* bracts oblong-lanceolate; calyx .01 long in flower, .013 long in fruit, lobes linear-lanceolate; corolla *white to yellow, twice to thrice* as long as calyx, short-velvety or glabrous; anthers included; nutlets .003 long, abruptly acute at tip, smooth, glossy —May and June — Subalpine and alpine Lebanon and Cœlesyria to Marash, and northward.

Var. **genuinum,** Boiss. Green; indument rather appressed.

Var. **pallidum**, Boiss. Pale; strigose; corolla light-colored.

Var. **angustifolium,** Boiss. Ashy; indument appressed.

Var. **brevifolium,** Boiss. Ashy or green; leaves .01 to .02 long.

† † *Biennials*, .5 *to* .8 *high.*

12. O. giganteum, Lam. ② .5 to .8, stout, ashy with appressed bristles and stellate hairs; root long, fusiform. Leaves oblong-lanceolate to lanceolate, the radical .15 long, petioled, the cauline sessile. Panicle often .3 to .4 long, strigose; fruiting racemes elongated, dense, one-sided; bracts *triangular-linear, long-tapering;* pedicels

slender, hispid, as long as fruiting calyx; fruiting calyx little enlarged, .013 long, *lobes linear;* corolla cream-colored, one-third longer than calyx; nutlets .002 long, ovate-pyramidal, glabrous, glossy — April to June — Waste places and fields; common to 1200 m.

13. O. auriculatum, Auch. ♃ .3 to .8, pale green or grey, appressed-stellate-pubescent and hairy; root fusiform; stem thick, densely leafy, panicled. Lower leaves oblong-lanceolate, tapering to a petiole, the intermediate *dilated*, *auricled* at base. Panicle .3 to .4 long; bracts *subcordate-triangular*, more or less tapering; pedicels slender, hispid, scarcely shorter than fruiting calyx; calyx .01 long, lobes *linear-spathulate;* corolla pale cream-colored, one-third longer than calyx; nutlets .002 long, ovate-triquetrous, oblique, glabrous, glossy— April and May — Waste places and fields; Plains of Palestine (Tristram).

A form was found by the author on Jebel Husha', with the auricled stem-leaves of O. auriculatum, and the linear calyx-lobes of O. giganteum, and cordate-lanceolate, acuminate bracts, intermediate between the two species. Nos. 12 and 13 are therefore probably one species.

25. PODONOSMA, Boiss. Podonosma.

Calyx 5-parted. Corolla tubular, with naked throat, furnished with a circular nectary. Filaments adnate below to corolla; anthers sagittate at base, long appendaged at apex, exserted. Style glabrous, with indistinct stigma. Nutlets curved, inserted by a basilar, flat, substipitate areola, and ending in a horizontal beak — Perennial herbs with aspect, indument, and nutlets of Alkanna, and flowers differing from those of Onosma principally by the long-appendaged, exserted anthers.

P. Syriacum, Labill. ♃ .3 to .5, glandular-pubescent, with intermixture of hairs with tubercled base, very brittle; branches densely leafy. Leaves sessile, oblong-lanceolate to linear-lanceolate, acute, the lower tapering at base, the upper half-clasping. Racemes leafy, at first capitate, then long, loose; calyx growing to .01 in fruit, lobes linear from a broader base, longer than fruiting pedicel, *more than half as long as corolla;* corolla bluish, .01 long; nutlets .002 long including beak, minutely tubercled — Spring — Fissures of rocks and walls; common throughout to 1500 m.

26. CERINTHE, L. Honeywort.

Calyx 5-parted, lobes leaf-like, unequal. Corolla tubular, naked at throat. Anthers hastate, with divergent lobes at base, and an acute appendix at tip. Style filiform, capitate. Nuts 2, ovate, almost long, composed of twin nutlets; basilar areola flat — Annual, biennial, or perennial herbs.

1. C. minor, L. ② ♃ .3 to .5, glabrous, glaucescent, erect, branching above. Leaves smooth or beset with a few warts, the lower oblong-spathulate, .1 to .2 long, tapering to a petiole, the upper cordate-oblong, sessile. Calyx-lobes *lanceolate*, more or less ciliate, in fruit enlarged; corolla yellow, sometimes purple, spotted at throat, *once and a half as long as calyx*, *cleft for more than one-third of its length into*

lanceolate, acuminate, erect-connivent lobes; anthers longer than filament, with long, lanceolate appendage; carpels .003 long — Spring — Rocky places; Lebanon, Antilebanon, and northward.

2. C. major, Lam. ⊙ .5 to 1, more or less tubercled or ciliate, or glabrescent-glaucous. Lower leaves obovate-spathulate, .15 to .2 long, tapering to a petiole, upper ovate-oblong, with cordate base. Calyx-lobes oblong, rather acute, ciliate, .01 to .015 long in fruit; corolla yellow or purple, *more than twice as long as calyx, with short, broad, triangular, at length recurved teeth; anthers shorter than filament, with short appendage;* carpels .003 to .004 long, .0025 to .003 broad — Spring — Mountains of central and eastern Palestine.

ORDER LXX. CONVOLVULACEÆ, (CONVOLVULUS FAMILY).

Chiefly twining or trailing herbs with alternate leaves (or scales), and regular, 5-*androus flowers, a* 5-*plaited or lobed, regular, tubular, campanulate, or funnel-shaped corolla (usually twisted in the bud), a* 2-4-*celled, free ovary, with* 1-2 *ovules in each cell; style* 1, *bifid, or* 2 — Calyx 5-sepaled or 4-5-cleft, persistent; stamens inserted near base of corolla; nectary annular, generally around ovary; fruit capsular, variously dehiscent, or a dry, indehiscent berry; seeds inserted at base of axis, with incomplete partitions between them at base of capsule; embryo coiled or curved, with or without cotyledons.

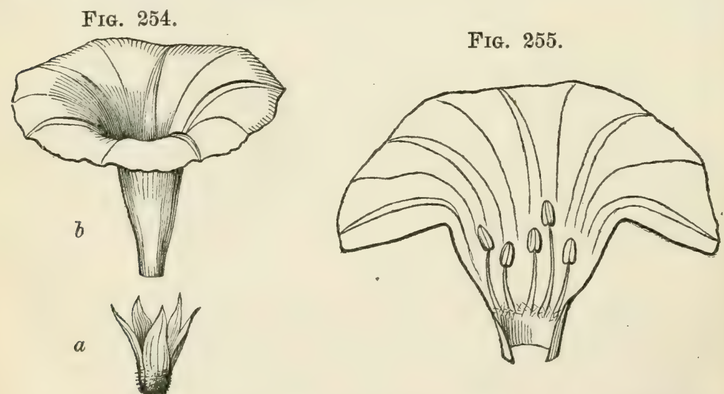


Fig. 254. Flower of an Ipomæa (*a*) The 5-parted calyx. (*b*) The broad-funnel-shaped, plaited corolla.

Fig. 255. The corolla laid open, showing the 5-stamens inserted near the base of the corolla-tube.

TRIBE I **ENCONVOLVULEÆ.** Leafy plants with crumpled cotyledons, and urved, crumpled embryo. Sepals 5. Æstivation plicate or induplicate

FIG. 256.

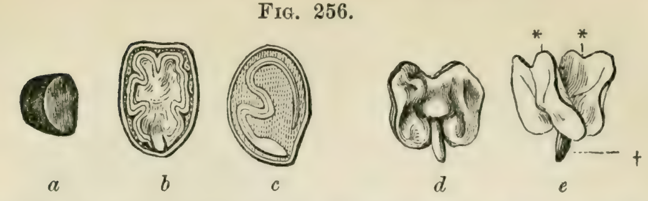


Fig. 256. (*a*) Seed of Convolvulus. (*b*) Longitudinal section of same, showing the crumpled cotyledon. (*c*) Another section of the same, showing the curved, crumpled embryo. (*d*) A face view of the cotyledon and radicle in the act of germination. (*e*) Half-side view of both cotyledons * * and radicle † in germination.

1. IPOMÆA. Calyx naked at base. Stigma capitate, usually 2-lobed.

2. CALYSTEGIA. Calyx bracted at base. Stigmas 2, ovate or oblong.

3. CONVOLVULUS. Calyx naked or 2-bracteoled at base. Stigmas 2, linear-cylindrical.

TRIBE II. **CRESSEÆ.** Low, leafy shrubs, with linear, 2-plaited cotyledons, and imbricated æstivation.

4. CRESSA. Corolla 5-parted to middle. Leaves minute. Styles 2.

TRIBE III. **CUSCUTEÆ.** Leafless, parasitic twiners, without cotyledons, and with spiral embryo. Calyx 4-5-cleft.

FIG. 257.

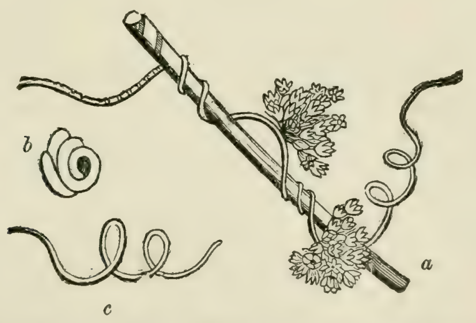


Fig. 257. (*a*) Stem of a Cuscuta, twining and parasitic on the stem of another plant, with two clusters of flowers. (*b*) The coiled embryo. (*c*) The same uncoiling itself in germination.

5. CUSCUTA. Calyx and corolla 5-cleft, the latter often urn-shaped in fruit.

1. IPOMÆA, L. MORNING-GLORY.

Calyx 5-sepaled. Corolla broad-funnel-shaped, showy, 5-lobed or repand, 5-plaited. Style 1, stigma capitate, generally 2-lobed. Ovary 2-3-4-celled, with 2 seeds in each cell. Capsule (in ours) 2-celled — Twining, glabrous herbs or shrubs.

1. I. littoralis, L. ♃ .3 to .5, trailing on the ground, rooting by under surface of branches. Leaves fleshy, .01 to .03 long, oblong, *fiddle-shaped or three-lobed, lateral lobes often bifid, terminal oblong-elliptical, all obtuse.* Peduncles of 1-2 upper axils 1-flowered, shorter than leaves; sepals elliptical, obtuse, mucronate; corolla .04 long, cream-colored, 4-6 times as long as calyx; lobes of stigma rounded; capsule .014 broad — Autumn — Sands along coast.

FIG. 258.

Fig. 258. (*a*) Flowering branch of an Ipomæa, with leaf, flower, buds, and capsule. (*b*) Capsule, with three, 2-seeded cells. (*c*) The same after the valves have fallen, showing one seed in its relations to the cell. (*d*) The embryo curved and wrinkled. (*e*) A cotyledon in germination, with its radicle below. (*f*) The two cotyledons in germination, with the radicle between them.

2. I. sagittata, Desf. ♃ Trailing and twining over grass and shrubs. Lower leaves cordate-suborbicular, the others *sagittate, with linear-lanceolate tips and barbs* .01 to .04 long. Peduncles axillary, shorter than leaves, 1-2-flowered, minutely 2-bracted near middle; sepals elliptical, obtuse, mucronulate; corolla .06 to .07 long, *pink*, 7-8-times as long as calyx; stigma *capitate, retuse;* capsules .016 broad — Autumn — Marshes of Alexandretta, and northward.

3. I. palmata, Forsk. ♄ *Bint-el-Basha. Bint-el-Ḥusn. Sitt-el-Ḥusn. Sharq-Faleq. Kuleik.* Trailing or climbing to a great height over trees and walls. Lobes of stipules septennate, oblong; leaves petioled, *quinate or septennate,* with elliptical, somewhat petiolulate, minutely serrulate leaflets, the lateral often bifid. Peduncles 1-3-flowered, longer than leaves; pedicels longer than calyx, thickened above; sepals oblong, obtuse; corolla *lilac-purple*, .06 long, five to six times as long as calyx; lobes of stigma rounded; capsule .01 broad — All the year — Plain of Gennesaret; el-Ḥûleh; coast. Extensively cultivated.

2. CALYSTEGIA, R.Br. BRACTED BINDWEED.

Calyx 5-sepaled. Corolla spreading-funnel-shaped, with repand, 5-plaited limb. Stigmas 2, ovate, flattish. Ovary imperfectly 2-celled, cells 2-ovuled. Capsule nearly 1-celled, 2-valved — Twining or trailing herbs, with 2 bracts subtending the calyx, forming an involucre.

* *Twining herbs, with cordate-oblong or sagittate-hastate leaves.*

1. C. sepium, L. ♃ Auricles of leaves entire, angled, truncate, or coarse-dentate. Peduncles long, 1-4-flowered; bracts ovate, somewhat cordate, *more or less tapering;* sepals oblong, acute; corolla .025 to .04 long, white or cream-colored — Spring — Hedges; coast.

2. C. sylvatica, W. K. ♃ Auricles of leaves usually entire, sometimes angled, or coarse-dentate. Peduncles long, 1-flowered; bracts broad, hood-like, ovate, *obtuse;* sepals ovate, obtuse, mucronate; corolla .07 to .08 long, white — Spring — Hedges; coast and Lebanon. Doutfully separated from last.

* * *Herbs trailing in maritime sands, with reniform, or round cordate leaves.*

3. C. Soldanella, L. ♃ Leaves fleshy, entire or somewhat repand, .015 to .03 broad. Peduncles axillary, 1-flowered, longer than leaves; bracts ovate, obtuse; sepals ovate, obtuse or retuse, mucronulate; corolla .04 to .05 long, purple — Spring — Phœnician coast (Barbey).

3. CONVOLVULUS, L. Bindweed. Convolvulus.

Calyx 5-sepaled. Corolla funnel-shaped with spreading limb, angled-5-lobed or repand-5-plaited. Style 1, with two, linear-cylindrical, often revolute stigmas. Ovary and capsule 2 celled, cells 2-ovuled, 2-valved — Herbs or shrubs, with pedicels often bracteolate, but bracteoles not forming an involucre.

* *Perennials.*

† *Shrubby plants with spinescent or persistent twigs. Ovary glabrous.*

1 C. hystrix, 2 lanatus, 3 Dorycnium.

† † *Unarmed, more or less shrubby plants. Ovary hirsute.*

4 C. holosericeus, 5 Cantabrica, 6 Aucheri, 7 lineatus, 8 Libanoticus.

† † † *Unarmed, tufted, stemless, mountain plants. Ovary hirsute.*

9 C. cochlearis.

† † † † *Unarmed, woolly, at length rusty, thick-stemmed. Ovary glabrous.*

10 C. secundus, 11 reticulatus, 12 Schimperi.

† † † † † *Branches slender, herbaceous, not climbing. Ovary glabrous.*

13 C. glomeratus, 14 pilosellæfolius.

† † † † † † *Branches slender, herbaceous, climbing.*

‡ *Ovary hirsute.*

15 C. Galaticus, 16 hirsutus, 17 stenophyllus.

‡ ‡ *Ovary glabrous.*

18 C. althæoides, 19 tenuissimus, 20 stachydifolius, 21 Palæstinus, 22 Scammonia, 23 arvensis.

* * *Annuals. Capsules glabrous. Peduncles 1-flowered.*

24 C. Cœlesyriacus, 25 Siculus, 26 pentapetaloides.

1. C. hystrix, Vahl. ♄ *Shibrîm. Shibriq. Shubruq.* 1 to 2, *erinaceous,* more or less beset with appressed or spreading hairs, *twigs spiny.* Leaves small, nearly sessile, truncate-subauricled at base, *oblong,* the lower .01 long, the upper scale-like. Flowers sessile, solitary or 2-3 together at base of twigs and in axils, subtended by an involucre of oblong bracts with somewhat recurved tips; sepals scarious, hirsute, obovate, hooded, mucronate, the inner narrower; corolla hirsute, narrow, scarcely twice as long as calyx; ovary glabrous — March and April — Wadi Ḥebrân (Sinai), and westward in Egyptian Desert.

2. C. lanatus, Vahl. ♄ *Barḥaimeh. Reḥâmah.* .2 to .4; newer branches woolly, older naked. Leaves grey, puberulent, oblong-spathulate, .015 to .04 long, tapering to a petiole, the upper sessile, lanceolate. Flowers *clustered, sessile,* forming interrupted spikes; sepals villous; corolla pinkish-white, silky, .02 to .03 long, twice to thrice as long as calyx — Spring — Beershaba and southward. A favorite forage for camels and sheep.

3. C. Dorycnium, L. ♃ .5 to .8, appressed-hirsute, divaricately branched, intricate, panicled. Leaves sessile, the lower oblong-spathulate to elliptical, .02 to .06 long, the upper linear. *Cymes terminal,* 1-3-flowered, *on a long peduncle;* pedicels with 2, minute bracteoles a little below the flower; sepals round-obovate, obtuse or retuse, mucronate; corolla .02 long, pink, five times as long as calyx— Summer —

Var. **oxysepalus,** Boiss. Sepals narrower, cuspidate — Common, especially in interior plains.

4. C. holosericeus, M.B. ♃ .2 to .3, *appressed-silky, glossy,* shrubby at base; stems ascending or procumbent, slender. Lower leaves lanceolate, tapering to a petiole, the others linear-lanceolate to linear, sessile. *Flowers nearly solitary in upper axils,* short- or long-peduncled; corolla white, silky outside, .035 long, 3-4 times as long as calyx — Spring — Dry hillsides; Aintâb, and northward.

5. C. Cantabrica, L. ♃ .3 to .4, *hirsute with appressed or spreading hairs or villous;* stems slender, decumbent or erect. Leaves green, the lower oblong-spathulate, tapering to a petiole, the upper sessile, oblanceolate to linear *Cymes* 1-3-*flowered, long-peduncled, terminal, forming a loose panicle; sepals inflated below,* cuspidate-acuminate; corolla pink, *hirsute along nerves outside,* .015 to .02 long, thrice as long as calyx — April to June — Dry hillsides; common throughout.

Var. **villosus,** Post. Soft villous — Woods; Mt. Cassius.

6. C. Aucheri, Choisy. ♃ .6 to .8, *woolly-villous,* with short appressed, and long spreading hairs; stems *stiff, dichotomously and intricately branched* from an indurated root-stock. Lower leaves ovate, intermediate sessile, ovate-lanceolate, .03 to .04 long, floral oblong-lanceolate. Cymes 3- (or generally by abortion) 1-flowered, terminal, forming a *loose, leafy, spreading panicle;* pedicels a little shorter than calyx; sepals oblong, abruptly cuspidate; corolla pink, hirsute outside, narrow, .02 long, *four times* as long as calyx — April and May — Amanus to Aintâb.

7. **C. lineatus,** L. ♃ .05 to .25, appressed-silky, many-stemmed from a woody root; stems ascending or procumbent, simple or somewhat branched. Leaves oblong to linear, .02 to .04 long, the lower long-tapering to a petiole. Cymes at end of branches, 3-1-flowered; pedicels shorter than calyx; sepals oblong-lanceolate, membranous at base, herbaceous at tip; corolla pink, .015 to .02 long, twice to twice and a half as long as calyx — April to June — Roadsides and hills; rather common.

8. **C. Libanoticus,** Boiss. ♃ .05 to .1, tufted, appressed-grey-canescent, many-stemmed from a naked, woody base. Leaves oblong to linear, .005 to .015 long, the radical tapering to a petiole. Flowers terminal, 3-5 in a loose cyme, or solitary; pedicels as long as calyx or shorter; sepals oblong, herbaceous at tip; corolla flesh-colored, .01 long, twice and a half to four times as long as calyx — Summer — Alpine Lebanon and Hermon.

9. **C. cochlearis,** Griseb. ♃ Silvery-silky, with a woody, branching root-stock. Leaves .005 to .007 long, *ovate-cuneate*, petioled, the upper face lineate and plaited along nerve. Flowers solitary, nearly sessile in tuft. Sepals ovate, more or less caudate-acuminate; corolla *purple*, silky in lines on the outside, .01 long, thrice as long as calyx — Summer — Marash. Between Aintâb and Marash; Amanus, and northward.

10. **C. secundus,** Desr. ♃ .3 to .6, silky-woolly; stems prostrate or ascending, leafy. Leaves on one side of stem, wrinkled, the lower oblong-spathulate, petioled, .04 to .05 long, the others *oblong to oblong-lanceolate*, sessile. Flowers 2-5 together in short-peduncled or sessile clusters, forming a one-sided, interrupted, leafy spike; bracts and sepals lanceolate; corolla white, .02 long, thrice as long as calyx — Spring — Sands along coast.

Var. **latifolius,** Post. Stem-leaves *ovate-oblong to oblong*, often .01 broad.

Var. **parvifolius**, Post. Leaves .01 to .015 long, *oblong to elliptical.*

11. **C. reticulatus,** Choisy. ♃ .3 to .6, appressed-woolly, stems prostrate or ascending. Leaves netted-wrinkled, the lower .02 to .05 long, *oblong*, tapering to a short petiole, the others *ovate-cordate*, obtuse or rather acute, .02 to .05 long, .006 to .013 broad. Flowers 2-5 together in short-peduncled or sessile, axillary clusters; bracts and sepals lanceolate, acute; corolla .01 long, white, twice as long as calyx — Spring — Aintâb, and northward and eastward.

12. **C. Schimperi,** Boiss. ♃ .3 to .5, *hispid-woolly;* stems prostrate or ascending. Leaves *plaited, wavy-margined*, .02 to .06 long, oblong-spathulate, tapering to a long petiole. Flowers 3-5 together in dense heads, *on peduncles nearly as long as leaves;* bracts and sepals *lanceolate at base, linear-caudate at tip, very hispid;* corolla white, .01 long, *scarcely longer than calyx* — Spring — Et-Tîh.

Var. **ellipticus,** Post. Upper leaves *elliptical, short-petioled* — Gaza desert.

13. **C. glomeratus,** Choisy. ♃ Root vertical, stems numerous, prostrate, wand-like, long, simple. Leaves green, appressed hirsute at

lower surface, short-petioled, minutely and obtusely *cordate-hastate*, the lower ovate, the upper oblong, acute. Head globular, on axillary peduncles, longer than leaves, loosely racemed; bracts leafy, acuminate, longer than calyx; sepals villous, oblong, acuminate; corolla white, glabrous, scarcely as long as calyx — Ford of ed-Dâmieh (Jordan).

14. C. pilosellæfolius, Desr. ♃ .5 to .8 or more, branching from neck, branches ascending or prostrate, more or less sparingly appressed-hirsute, bearing flowering branches from middle up. Leaves pale-green, hirsute, margin often repand-wavy, the lower oblong, tapering to a petiole, the upper sessile, lanceolate, acute, sometimes subcordate at base. Flowers 1-5 together, cymulose, the cymes forming a loose raceme, pedicels shorter than calyx; sepals hairy, elliptical, acute, herbaceous at tip; corolla pink, twice to thrice as long as calyx, .01 to .013 long, hairy at angles; capsule ovate, glabrous — April to July — Waste places; el-Ghor; Qaryetein.

15. C. Galaticus, Rostan. ♃ .3 to .6, densely silky-woolly, flexuous. Leaves *more or less plaited, cuneate-ovate to ovate-cordate*, .02 to .03 long, sinuate-margined, often obscurely 3-5-lobed, the uppermost acute. Peduncles axillary, as long as leaf or longer, 1-3-flowered; pedicels about as long as calyx; bracts *setaceous;* sepals ovate-elliptical, short-acuminate; corolla .02 long, *purple*, 3-4-times as long as calyx; seeds netted-wrinkled — Spring — Grassy places; Aintâb, Marash, and northward.

Var. **albiflorus,** Post. Indument finer. Flowers white—Aintâb; Marash. (*C. Germaniciæ, Boiss. et Haussk.*).

16. C. hirsutus, Stev. ♃ .6 to 1, more or less hirsute with yellowish hair, decumbent or climbing. Lamina of leaves as long as petiole to four times as long, *oblong-cordate to cordate-hastate*, auricles entire or dentate-lobed. Peduncles much longer than leaves, 3-1-flowered; pedicels as long as calyx or longer; bracts *linear;* sepals ovate-oblong, acuminate or obtuse and mucronate; corolla .02 to .03 long, pinkish or yellowish, four times as long as calyx; seeds tubercled — Spring — Fields and hedges; common.

Var. **tomentosus,** Boiss. Leaves *pannous-silky* — Lebanon.

17. C. stenophyllus, Boiss. ♃ .6 to 1, appressed-tomentellous, decumbent. Leaves cordate-auricled to hastate at base, with wavy, crenate, or serrate-lobed margins, the lowest cordate to oblong, long-petioled, *the upper or all linear-lanceolate to linear.* Peduncles 3-1-flowered, as long as leaves or longer; pedicels about as long as calyx; bracts minute, awl-shaped; sepals ovate. obtuse, sometimes mucronate; corolla *yellow*, .02 long, four times as long as calyx — May and June — Bushy places; Lebanon and Antilebanon, and Phœnician plain.

18. C. althæoides, L. ♃ .5 to 1, appressed-villous or hirsute, diffuse or climbing. Lower leaves long-petioled, cordate-ovate, obtusely crenate or lobed; upper *pedate-cleft or parted, with oblong to linear, entire to dentate lobes.* Peduncles much longer than leaves, 1-2-flowered; pedicels *longer* than calyx; bracts setaceous; sepals ovate-oblong, scarious-margined, sometimes mucronulate; corolla *pink*, .02 to .03

long, 3-5-times as long as calyx — April to June — Fields and thickets; common.

Var. **indivisus,** Post. Leaves crenate or serrate, or indistinctly serrate-lobed — Hems; Aintâb.

19. C. tenuissimus, S. et S. ♃ .5 to .8, *appressed-silky;* stems diffuse or climbing. Lower leaves long-petioled, linear-plaited, cordate-ovate, obtusely repand-crenate; upper pedately or palmately parted into *long, linear lobes.* Peduncles 1-2-flowered, much longer than leaves; pedicels as long as calyx or longer; bracts *minute;* sepals ovate-oblong, obtuse, scarious-margined, often mucronulate; corolla pink, 4-5-times as long as calyx — Spring — Rocky places; Kesruwân (Lebanon). Probably a silky, much dissected variety of the last.

20. C. stachydifolius, Choisy. ♃ .3 to .6, stems pubescent with spreading or *retrorse* hairs, prostrate, flexuous. Leaves appressed-pubescent, sometimes glabrescent above, petioled, *ovate-cordate, crenate-lobed and more or less* dentate. Peduncles 1-3-flowered, much longer than leaves; pedicels twice to thrice as long as calyx, at length refracted; bracts long, awl-shaped; sepals elliptical, scarious margined, obtuse or retuse, muticous; corolla purple, .02 to .025 long, four times as long as calyx — Grassy places; coast; Moab to Ḥaurân, Damascus, Cœlesyria, Aintâb, and eastward.

21. C. Palæstinus, Boiss. ♃ .3 to 1, *appressed-tomentellous;* stems prostrate or decumbent. Leaves *ovate-oblong*, obtusely *cordate-auriculate, undulate-crenate*, the lower long-petioled. Peduncles axillary, 3-1-flowered, *shorter than leaves or a little longer;* pedicels as long as calyx or shorter; bracts setaceous, minute; sepals oblong-spathulate, obtuse, muticous; corolla yellow, four times as long as calyx — Spring — Palestine.

22. C. Scammonia, L. ♃ *Scammony. Maḥmudîyeh. Soqmûmîyeh.* 1 to 5, *glabrous*, from a long, *fusiform root* (the concrete juice of which is the Scammony of the Materia Medica), climbing or trailing. Petiole shorter than *sagittate*, entire or remotely serrate blade, upper leaves sometimes linear. Peduncles longer than leaves, 3-1-flowered; pedicels somewhat shorter than calyx; bracts minute, *scarious;* sepals ovate, scarious-margined, obtuse or truncate, sometimes mucronate; corolla .03 long, *cream-colored, reddish along plaits*, 4-5 times as long as calyx — Summer and autumn — Hedges; Gilead to Galilee, Phœnician coast, Lebanon, Nusairy Mountains, Kurd Dagh, Amanus, and northward.

23. C. arvensis, L. ♃ *Middeid. 'Ulleiq.* .3 to 1, glabrous or pubescent, prostrate or climbing from a *slender* root-stock. Petiole shorter than *sagittate or hastate, cordate-ovate, triangular-ovate to oblong or linear*, entire or repand-dentate blade. Peduncles usually longer than leaves, 1-3-flowered; pedicels as long as calyx or longer; bracts awl-shaped; sepals *round-ovate*, scarious-margined; corolla *white or pink*, .02 long, 6-7 *times as long as calyx* — May to August — Common.

24. C. Cœlesyriacus, Boiss. ⊙ .3 to .5, glabrescent or sparingly hirtulous; stems decumbent or ascending. Lower leaves petioled, *cordate-reniform*, undivided, *obtuse*, somewhat repand, *intermediate and upper dentate-lobed or parted* into oblong to linear lobes,

uppermost often linear-hastate. Peduncles shorter than leaf; pedicel longer than calyx, in fruit recurved and *often longer than peduncle;* sepals round-obovate cuspidate; corolla .012 long, *pink*, about thrice as long as calyx —Spring — Phœnician coast, Lebanon, Cœlesyria, Antilebanon, and eastward.

25. C. Siculus, L. ⊙ .4 to .6, more or less pubescent; stems procumbent or erect. Leaves petioled, *cordate-ovate to cuneate-ovate, acute.* Peduncles longer than flower, shorter than leaf; pedicel *very short;* bracts lanceolate, *as long as calyx or longer;* sepals elliptical, tapering; corolla .01 long, *blue*, *scarcely twice as long as calyx* — Spring — Moab; Valley of lower Jordan; Marsaba; Hill country of Samaria; Nahr-el-Kelb.

26. C. pentapetaloides, L. ⊙ .2 to .6, sparingly pubescent; stems ascending and prostrate, simple. Leaves *oblong-spathulate, petioled* to *linear-lanceolate, sessile.* Peduncles shorter than leaves; pedicels *longer than calyx;* bracts minute; sepals somewhat scarious, *round-ovate*, acute; corolla .008 long, *blue*, twice to thrice as long as calyx — Spring — Grassy places; common.

C. tricolor, L. is found near gardens, but not spontaneous.

4. CRESSA, L. Cressa.

Calyx 5-parted to base. Corolla funnel-shaped, 5-parted beyond middle. Stamens included. Styles 2, stigmas capitate. Ovary 2-celled; cells 2-seeded — Much branched, low shrubs, with minute leaves.

C. Cretica, L. ♃ .1 to .2, ashy with appressed and spreading hairs. Leaves .003 long, ovate-subcordate at base to elliptical-lanceolate. Peduncles very short, forming dense, terminal, bracted spikes; calyx-lobes hooded, .003 long, elliptical, obtuse; corolla-tube about as long as calyx, lobes reflexed — Spring — Philistine coast, and southward.

5. CUSCUTA, L. Dodder. *Khaniq-el-Kirsenneh.*

Calyx 4-5-cleft or -parted. Corolla tubular or campanulate, 4-5-cleft, often urn-shaped after flowering, generally furnished with fimbriated or dentate scales under the stamens. Stamens adnate to the corolla-tube, alternate with its lobes. Ovary 2-celled, 4-ovuled; styles 2, free, or 1. Fruits usually capsular, membranous, opening by a lid or irregularly torn, rarely baccate — Filiform, branching parasites.

* *Styles* 2. *Stigmas elongated. Flowers in globular heads.*

† *Styles as long as stigmas, or shorter. Capsule opening by a lid.*

‡ *Styles longer than ovary.*

1. C. Epithymum, L. ⊙ Heads .005 broad; calyx-lobes *acute;* corolla-tube cylindrical, longer than calyx, limb *shorter* than tube, lobes ovate, acute; scales connivent, fringed — Spring — On Genista, Labiates, Poterium, etc.

2. C. planiflora, Ten. ⊙ Heads .005 to .007 broad; calyx-lobes *rather obtuse;* corolla scutellate, tube cylindrical, longer than calyx, limb *longer* than tube, rotate, *flattened*, lobes *short-acuminate;* scales connivent, fringed — April to July —

Var. **approximata,** Eng. Calyx-lobes membranous. Styles much longer than ovary — Common to Alpine regions.

3. C. Palæstina, Boiss. ⊙ Heads .002 to .003 broad; calyx-lobes broad, keeled, *obtuse;* corolla scarcely longer than calyx, lobes short-ovate, obtuse; scales rather large, broad-spathulate, *denticulate* — Spring — Coast to middle mountain regions.

‡ ‡ *Styles much shorter than ovary.*

4. C. brevistyla, A. Braun. ⊙ Stem branching. Flowers sessile; calyx scarcely shorter than corolla, parted nearly to base into ovate, obtuse lobes; corolla-lobes ovate, spreading ; scales small, truncate, sometimes bilobed; styles about as long as somewhat club-shaped stigmas — Sinai.

5. C. Epilinum, Weike. ⊙ Heads dense; calyx *appressed to corolla*, as long as its tube, deeply parted into broad, ovate lobes; corolla-tube nearly globular, limb half as long as tube, lobes triangular, acute, spreading; scales small, appressed to tube; stigmas twice as long as style, at length nearly club-shaped — Spring — Plain of Sharon; Moab; Gilead.

† † *Style a short tubercle or* 0. *Stigma as long as ovary. Capsule irregularly torn.*

6. C. Arabica, Fresen. ⊙ Heads .005 broad, few-flowered; *pedicels as long as calyx or longer;* calyx *cup-shaped*, cleft to middle into ovate lobes; corolla scarcely twice as long as calyx, *half-globular*, with ovate, acute lobes; scales minute, dentate; stamens somewhat exserted — Spring — Lower Jordan Valley, and around Dead Sea, and southward to Sinai and Egypt.

* * *Style* 1. *Stigma capitate*, 2-*lobed. Capsule opening by a lid.*

7. C. monogyna, Vahl. ⊙ Stem thicker than in other species, .01 in diameter. Flowers .004 long, 8-16 *in a spike-like raceme* .02 to .05 long; calyx-lobes ovate, imbricated, obtuse; corolla in flower cylindrical, tube longer than calyx, with short, erect, ovate, obtuse, crenulate lobes; anthers cordate-ovate, nearly sessile a little below throat; scales hippocrepidiform, denticulate; style as long as nearly globular, 2-lobed stigma, much shorter than globular-ovate ovary; capsule .008 long, .005 broad, ovate, capped by marcescent corolla — Spring — Lebanon to Aintâb, and northward.

Var. **pauciflora,** Post. Flowers solitary or 2-4 in a loose raceme — Cœlesyria; Hermon; Aintâb.

ORDER LXXI. **SOLANACEÆ,** (NIGHTSHADE FAMILY).

Herbs or shrubs, with colorless juice, alternate (rarely opposite) leaves, usually regular, 5-*merous,* 5-6-7-*androus flowers, on bractless pedicels; the corolla imbricated, convolute or valvate in bud, generally plaited; the fruit a* 2-*celled, many-seeded pod or berry* — Flowers usually perfect. Calyx

5-cleft or parted, persistent or with a persistent base and deciduous tube. Corolla sometimes slightly irregular. Anthers 2-celled. Ovules anatropous or amphitropous. Style 1, stigma entire or bilamellate. Seeds with reticulate or pitted testa. Embryo curved, spiral, or straight, in fleshy albumen — Mostly narcotic and poisonous plants.

Fig. 259.

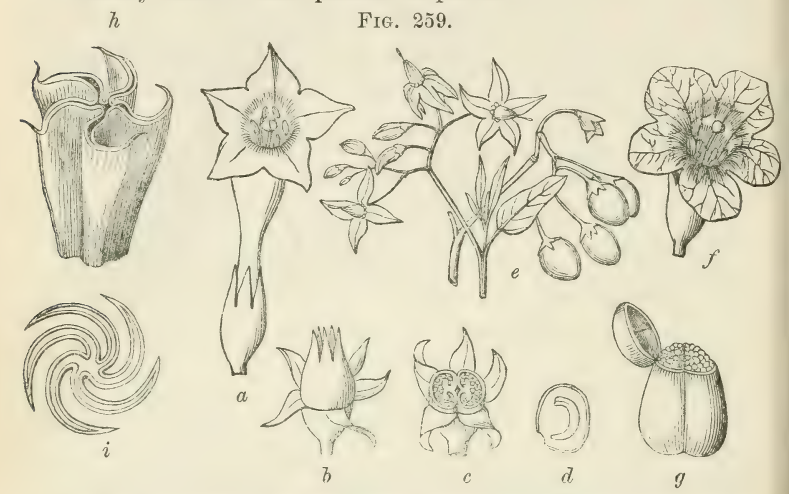


Fig. 259. (*a*) Flower of Nicotiana Tabacum, showing the 5-cleft calyx, tubular corolla, with 5-cleft, rotate limb, 5 stamens, with 2-celled anthers, and bilamellate stigma. (*b*) Capsule of the same, with persistent calyx, the capsule splitting at tip into 5 valves. (*c*) The same cut horizontally, showing the two cells, with central placentæ and many seeds. (*d*) Section of seed of a Solanum, showing the curved embryo. (*c*) Flowering and fruiting cyme of Solanum Dulcamara, showing the 5-cleft calyx, the 5-parted, rotate corolla, with very short tube, and the berry-like fruit. (*f*) Slightly irregular flower of Hyoscyamus. (*g*) Capsule of the same, opening by a lid, showing the two cells, and central placentæ. (*h*) Convolute æstivation of flower of Datura. (*i*) The same seen from above.

* *Fruit a berry.*

1. SOLANUM. ⊙ ♄ Flowers in cymes or umbels, out of axils. Fruiting calyx unchanged.
2. PHYSALIS. ♃ Flowers solitary. Fruiting calyx much inflated, enclosing fruit.
3. WITHANIA. ♄ Flowers clustered in axils. Fruiting calyx inflated, enclosing fruit.
4. LYCIUM. ♄ Thorny shrubs. Flowers clustered in axils. Fruiting calyx unchanged.
5. MANDRAGORA. ♃ Stemless. Leaves rosetted. Flowers on scapes. Fruiting calyx enlarged.

* * *Fruit a capsule.*

6. DATURA. ⊙ Capsule large, prickly, not included in calyx.
7. HYOSCYAMUS. ⊙ ♃ Capsule not prickly, included in calyx. Corolla oblique.

1. SOLANUM, Tourn. NIGHTSHADE.

Calyx campanulate or spreading, 5-toothed or -parted, not growing in fruit. Corolla rotate, with a very short tube, 5-lobed. Filaments

inserted at throat of tube, very short, with connivent or coherent anthers opening at tip by two pores or chinks. Style simple. Seeds granular or scrobiculate.

* *Unarmed. Anthers opening by introrse pores or chinks.*

1. S. nigrum, L. ⊙ *'Inab-ed-Dib.* .3 to .6, *glabrous or puberulent;* angles of branches prominent, often tubercled. Leaves ovate or deltoid-rhomboid, entire, angled, or coarsely sinuate-serrate. Corymbs 3-6-flowered, umbellate, short peduncled; fruiting pedicels thickened at tip, reflexed; calyx-lobes rounded; corolla white, pubescent, twice as long as calyx; berries *black*, .006 in diameter — All the year — Roadsides and waste places; common everywhere.

Var. **induratum,** Boiss. Branches perennant, indurated at base — Jordan Valley.

Var. **chlorocarpum,** Boiss. Berries *yellow* — with type.

Var. **humile,** Boiss. Berries *yellow*. Branches less angled than in type — Runs into preceding.

2. S. miniatum, Berb. ⊙ .3 to .5, *pubescent to villous;* angles of branches prominent, often tubercled. Leaves ovate-deltoid, sinuate-serrate. Corymbs few-flowered, short-peduncled; fruiting pedicels thickened at tip, reflexed; corolla white, pubescent, twice as long as calyx; berries *red* — December to September — Central Palestine; Lebanon. Seems only a variety of last.

3. S. villosum, Lam. ⊙ *'Inab-ed-Dib.* .3 to .4, *villous woolly;* angles of branches nearly obsolete. Leaves ovate-deltoid, sinuate-dentate. Corymbs few-flowered, short-peduncled; fruiting pedicels thickened at tip, deflexed; corolla white, pubescent, twice as long as calyx or longer; berries *yellow* — All the year; common. Seems but a variety of *S. nigrum.*

4. S. Sinaicum, Boiss. ♄ .3 to .4, *shrubby at base;* newer twigs herbaceous, green, appressed pubescent; branches thickish, ascending. Leaves oblong to rhombic, irregularly sinuate, dentate-lobed or undivided, the lower long-petioled the upper short-petioled. Cymes 2-5-flowered; pedicels deflexed, scarcely thickened at tip, elongated; calyx-lobes *oblong*, obtuse; corolla white, thrice as long as calyx; berries *black* — March — Sinai.

5. S. Dulcamara, L. ♄ .3 to 1, glabrescent or puberulent, shrubby below, new branches herbaceous. Leaves *ovate to ovate-cordate and ovate-lanceolate*, undivided, *hastate, or with one to five, small, ovate lobes at base.* Cymes long-peduncled, *several times dichotomously branching, many-flowered;* pedicels jointed; calyx-lobes triangular, broad, short; corolla purple, 6-7-times as long as calyx; berry ovate, .008 in diameter, *scarlet* — Summer — Common to alpine regions.

* * *Prickly. Anthers opening by vertical or extrorse pores.*

6. S. coagulans, Forsk. *Khâdak.* ♄ .6 to 1.5, *appressed-woolly, canescent.* Prickles .002 to .004 long, recurved. Leaves ovate, entire, repand or sinuate-lobed. Cymes short-peduncled, *bifid, the lower pedicel*

bearing a fertile flower, the others sterile; calyx-lobes triangular; corolla .02 broad, purple; berry *yellow*, .025 in diameter — Spring — Lower Jordan Valley and wadies about Dead Sea.

Solanum tuberosum, L. is the *Potato*, arabicé *Baṭaṭa*, and S. Melongena, L. the *Egg-plant*, arabicé *Beitinjân*, or more correctly *Bâdhinjân*.

Batatas edulis, Choisy, is the *Sweet Potato.*

2. PHYSALIS, L. Ground-Cherry.

Calyx campanulate, 5-cleft, inflated in fruit, with connivent lobes, enclosing the berry. Corolla somewhat rotate, limb plaited, 5-angled or -cleft. Stamens inserted near base of corolla; filaments thread-like; anthers splitting lengthwise. Ovary 2-celled; style filiform; stigma bilamellate. Berry globular, much smaller than calyx — Perennial herbs, with solitary, nodding flowers.

P. Alkekengi. L. Alkekengi. ♃ .4 to .6, sparingly hirtulous; root-stock creeping; stems erect, simple or sparingly branched. Leaves petioled, ovate, acuminate, repand, the upper opposite. Corolla *yellow*, .012 long; fruiting calyx .03 long, .02 broad, *red* — Summer — Kurd-Dagh to Marash, and northward.

3. WITHANIA, Pauq. Withania. *'Ub'ub.*

Calyx campanulate, 5-cleft, inflated in fruit, enclosing the berry. Corolla campanulate, 5-cleft, with valvate lobes. Stamens 5 (rarely 6-7), inserted near base of corolla; filaments flat; anthers erect. Style filiform, stigma short-bilamellate. Berry globular; seeds kidney shaped — Woolly shrubs, with upper leaves usually opposite.

W. somnifera, L. *Sekrân. Merjân. Semm-el-Fâr. Khaṣraqût. Fuqqueish.* ♄ .1 to 1.5, branches flexuous. Leaves ovate, .05 to .1 long. Flowers perfect, .005 long, *very short-pedicelled*, clustered in the axils, rarely solitary; calyx-lobes linear, muticous; corolla greenish-yellow; berry .005 in diameter, red, loosely contained in the .015 long, membranous, closed calyx — Summer — Coast and lower mountains; Jordan Valley; and northward and southward.

4. LYCIUM, L. Matrimony-Vine. *'Ausaj.*

Calyx cup-shaped or tubular, irregularly dentate or bilabiate, not growing in fruit. Corolla funnel-shaped, with spreading limb and imbricated lobes. Stamens inserted at middle of tube; anthers with parallel cells. Ovary implanted on disk; style filiform; stigma capitate or bilamellate. Berry globular or ovate — Thorny shrubs, with axillary or terminal spines, and clustered leaves.

1. L. Europæum, L. *Box-Thorn.* ♄ 2 to 4, glabrous or pruinose, glaucescent. Leaves oblanceolate, oblique, obtuse or acutish. Calyx at first equally toothed, then somewhat 2-lipped; corolla *violet*, lobes *one-third* as long as tube; *stamens included* — Summer — Hedges along coast; Jordan Valley.

2. L. Arabicum, Schweinfurth. ♄ 1 to 3, grey-tomentellous. Leaves spathulate-oblong. Calyx-teeth ciliated, unequal; corolla *violet*, lobes *one-fourth* as long as tube; *anthers nearly included* — Summer — Er-Ramleh in et-Tîh; Shittim plain; Sinai.

3. L. Barbarum, L. ♄ *Barbary Box-Thorn.* 1 to 4, glabrous, glaucescent. Leaves oblong-spathulate to linear, obtuse. Calyx somewhat bilabiate ; corolla *red, lobes scarcely shorter than tube ; filaments exserted* — Summer —

Var. **brevilobum,** Post. Corolla-lobes ovate, *half* as long as tube ; *anthers partially exserted* — —Hedges ; Cœlesyria to Palmyrene Desert, Aleppo, and northward.

5. ATROPA, L. Belladonna.

Calyx leafy, deeply 5-cleft, growing little in fruit. Corolla tubular-campanulate, with 5, broad, imbricated lobes. Stamens 5, inserted at base of corolla, filaments thickened at base, included, cells of anthers distinct. Ovary 2-celled, implanted on disk ; style somewhat exserted ; stigma dilated, short-bilamellate. Berry globular, juicy, seeds numerous, flattened, pitted — Perennial herbs.

A. Belladonna, L. ♃ .5 to 1, viscid-pubescent or glabresent, stem erect, 2-3-forked above. Leaves ovate to oblong, often .2 long, acuminate, short-petioled, the upper twin, unequal. Flowers axillary, solitary or rarely twin, on nodding peduncles ; calyx-lobes triangular-ovate, acuminate ; corolla dirty brown, with rounded lobes ; berry red, .015 broad, .01 long — Gaiour Dagh (Amanus) 1500 m.

6. MANDRAGORA, Juss. Mandrake. *Luffâḥ. Beiḍ-el-Jinn.*

Calyx leaf-like, 5-cleft or parted, growing in fruit. Corolla campanulate, 5-cleft to half its length, the sinuses induplicate between lobes. Stamens inserted below middle of tube ; filaments thread-like ; anther-cells nearly parallel. Ovary implanted on disk ; style filiform ; stigma capitate, 2-lobed. Berry large, globular, succulent ; seeds punctate-scrobiculate —Stemless herbs, with fleshy root, and rosetted leaves.

Fig, 260.



Flowering state of Mandrogora.

M. officinarum, L. ♃ Root more or less branched, fancifully supposed to resemble the body of a man. Leaves .15 to .25 long in flower, 4 or more in fruit, ovate-oblong to ovate, wrinkled, crisp, sinuate-dentate or entire, minutely hairy or glabrous, the lower obtuse, the upper often acute or acuminate. Peduncles 1-flowered, clustered at neck, 1-∞-times as long as calyx ; calyx-lobes lanceolate, somewhat shorter than .025 to .03 broad, red berry ; corolla whitish-green — January to March — Deserted fields ; common.

7. DATURA, L. Jamestown-Weed. Thorn-Apple.

Calyx tubular, 5-angled, 5-toothed or spathaceous at apex, in fruit cut off above the persistent base. Corolla funnel-shaped, 5-lobed, twisted in bud. Stamems inserted near base of tube, included ; anthers

linear, with parallel cells, opening by introrse slits. Ovary 2-celled or by false septa 4-celled, ovules attached to true or false septa ; style filiform ; stigma bilamellate. Capsule oblong-globular, prickly, loculicidally and septicidally 4-valved — Annual herbs, with an unpleasant odor, and large, white flowers.

1. D. Stramonium, L. ⊙ .6 to 1, *minutely papular, green ;* stem stout. Leaves petioled, ovate, .1 to .15 long, *unequally sinuate-dentate.* Corolla .08 to .1 long, pentagonal, lobes 5, cuspidate ; capsules .03 to .04 long — May to September — Roadsides and waste places ; common.

2. D. Metel, L. ⊙ .6 to 1, *densely pubescent, greyish ;* stem stout. Leaves .1 to .25 long, ovate, *cuneate or cordate at base, entire or obsoletely repand.* Corolla .15 long, pubescent outside ; lobes 10, cuspidate ; capsules .03 to .04 long — Summer — Coast ; Safîta.

Fig. 261.



Flower of D. Stramonium

8. HYOSCYAMUS, L. Henbane. *Benj.*

Calyx tubular-campanulate, 5-cleft near apex, growing in fruit, ribbed, enclosing capsule. Corolla funnel-shaped, sometimes laterally split, with oblique, 5-fid limb, and broad, imbricated lobes. Stamens inserted on tube, generally exserted ; anthers oblong, with parallel cells. Style filiform ; stigma capitate ; capsule opening by a lid near apex ; seeds tubercled or pitted — Herbs, with a narcotic odor.

1. H. muticus, L. ♃ *Sekrân. Semen-el-Fâr.* .3 to .6, green, crisp-pubescent or hairy ; stems thick, often warty, simple or sparingly branched. Leaves *fleshy*, cuneate at base, ovate to rhombic, acute, angled or toothed-lobed, rarely entire, the lower petioled, blade .1 or more long, the upper sessile ; the floral oblong-lenticular. Corolla *white, with violet spots*, .02 long, tube somewhat exserted, *limb irregularly split ;* fruiting calyx .04 long, .015 broad, with broad, triangular, *muticous* teeth, about one-sixth as long as tube — Spring — Palmyrene Desert ; Wilderness of Judea, and southward to Sinai, and Egypt.

2. H. pusillus, L. ⊙ *Sufeirâ.* .05 to .3, *crisp papillose-pubescent ;* stem erect, simple or branching from neck. Leaves oblong to oblong-lanceolate, acute, entire, sinuate-repand to pinnatifid and pinnatipartite. Corolla .015 to .02 long, *yellow with purplish throat,* included tube, and oblique limb *with nearly equal lobes ;* fruiting calyx .015 long, .006 broad, with triangular, prickly-pointed teeth, about one-fourth as long as tube — March to June — Ḥaurân ; Sinai.

3. H. reticulatus, L. ⊙ ② .4 to .5, *villous with cobwebby hairs;* stem stout, erect, branching from neck or above. Leaves oblong to lanceolate, *more or less pinnatifid to pinnatipartite*, the radical petioled, the cauline *sessile but not clasping*, the floral entire, longer than flower. Corolla *nearly regular*, .025 long, *purplish-violet, reticulate,* with rounded lobes one-fourth as long as tube; fruiting calyx .025 long, .01 broad, not contracted above middle, *with recurved, lanceolate, prickly-pointed teeth*, about *half as long* as tube — Spring — Fields; common.

Fig. 262.



Flower of H. reticulatus.

Var. **integrifolius,** Boiss. Leaves sinuate, irregularly toothed or entire — Cœlesyria; Antilebanon; Gilead; Ḥems; Aintâb.

4. H. albus, L. ♃ .3 to .6, *villous-viscid;* stems erect, branching. Leaves petioled, ovate-orbicular, cuneate to cordate at base, *coarsely and obtusely dentate-lobed;* floral leaves cordate-ovate, dentate, or oblong, entire, tapering at base. Corolla *pale yellow, purple or green at throat*, .015 to .025 long, with oblique limb, and unequal lobes; stamens slightly longer than tube; fruiting calyx .02 long, .008 broad, with *short, triangular*, acute teeth, one-sixth to one-eighth as long as tube — March to July — Walls, roadsides, and waste places; common, especially along coast.

Var. **desertorum,** Ascherson. Flowers small; lower peduncles often twice to thrice as long as calyx; calyx teeth very short — Palmyrene Desert; around Dead Sea.

Var. **repandus,** Post. *Seikerân.* Leaves small, .02 to .03 long, rhombic-ovate, repand or entire — Sinai.

5. H. aureus, L. ♃ .3 to .6, villous-viscid; stems *decumbent or pendulous*, brittle. Leaves petioled, ovate-orbicular, cordate at base, *triangular-lobed and acutely dentate;* floral leaves triangular-ovate to oblong, *acutely dentate.* Flowers *all peduncled;* corolla *bright yellow*, purple at throat, .025 long, tube exserted, limb obliquely cleft, the upper two lobes much smaller; *stamens and style long-exserted;* fruiting calyx ascending or nodding, .03 long, .01 broad, with *triangular-lanceolate*, long-acuminate, scarcely prickly teeth, one-fourth as long as tube — March to July — Walls and banks; common.

Var. **parvifolius**, Post. Leaves .01 to .03 long, doubly serrate-denticulate — Castle of Baniâs; Es-Salt.

Among the cultivated plants of this Order are Nicotiana Tabacum, L., Tobacco, Arabicé *Titûn;* Nicotiana rustica, L., Arabicé *Tembek;* Atropa Belladonna, L., Deadly Night-shade; and Capsicum annuum, L., Cayenne Pepper, Arabicé *Fuleifileh.*

Order LXXII. SCROPHULARIACEÆ, Lindl.

(Figwort Family.)

Herbs or shrubs, with perfect, more or less irregular flowers; stamens 2, *or* 4 *didynamous (with rarely a fifth, perfect or imperfect), inserted on the tube of the corolla, al-*

ternating with its lobes, which are imbricated in the bud; fruit a 2-celled, usually many-seeded pod, with 4 placentæ in its axis; seeds anatropous, with a straight or curved embryo in copious albumen — Calyx free, lobes 5-4. Corolla campanulate, rotate, or 2-lipped, the upper lip entire, retuse or 2-lobed, the lower 3-lobed. Anthers 2-celled, or 1-celled by union of tips of cells. Style single; stigma entire or 2-lobed — An order of bitterish plants, some of which are narcotic.

SERIES A. **PSEUDOSOLANACEÆ.** All the leaves alternate. Inflorescence centripetal. Upper lip of corolla outside in bud. Fifth stamen sometimes perfect.

TRIBE I. **VERBASCEÆ.** Corolla rotate, slightly irregular.

1. VERBASCUM. ② ♃ ♄ Fertile stamens 5. Plants usually woolly, sometimes green.
2. CELSIA. ⊙ ② ♃ ♄ Fertile stamens 4. Green herbs, sometimes shrubby at base.

SERIES B. **ANTIRRHINEÆ.** All or at least the lower leaves (in ours) opposite. Inflorescence centripetal or partly so. Upper lip of bilabiate corolla outside in bud; tube gibbous, saccate or spurred at base. Fifth stamen rudimentary or 0.

TRIBE II. **ANTIRRHINEÆ.** Inflorescence centripetal, uniform. Corolla-tube saccate or spurred at base. Pod opening by chinks or pores.

3. LINARIA. ♃ ⊙ Corolla spurred at base. Throat with a palate or 0.
4. ANARRHINUM. ♃ Corolla tubular, throat not closed by a palate.
5. ANTIRRHINUM. ⊙ ♃ Corolla personate, throat closed by a palate.

TRIBE III. **CHELONEÆ.** Inflorescence partly centrifugal. Corolla not spurred at base.

6. SCROPHULARIA. ⊙ ② ♃ Flowers small, more or less greenish or lurid-purple.

TRIBE IV. **GRATIOLEÆ.** Inflorescence centripetal. Corolla tubular or campanulate, not spurred.

7. LINDENBERGIA. ♄ Hispid, nearly leafless, desert plants. Flowers violet, .015 long.

SERIES C. **RHINANTHIDEÆ.** Leaves opposite or alternate. Inflorescence usually centripetal or composite. Corolla lobes variously imbricated, the anterior or lateral usually outside in bud. Stamens 4 or 2, fifth stamen (in ours) 0.

TRIBE V. **DIGITALEÆ.** Inflorescence centripetal, spiked. Corolla tubular or campanulate, with flat lobes. Stamens 4. Cells of anthers usually confluent at tip Capsule 2-valved.

8. DIGITALIS. ♃ Leaves alternate. Flowers rusty-colored, .015 long.

TRIBE VI. **VERONICEÆ.** All, or at least the lowest, leaves opposite. Inflorescence centripetal, racemed or spiked. Corolla-tube short, with flat lobes, little or not at all bilabiate. Stamens distant, 2. Anthers muticous, 1-2-celled. Fruit capsular.

9. WULFENIA. ♃ Leaves .15 to .25 long. Corolla slightly bilabiate.
10. VERONICA. ⊙ ♃ Leaves small. Corolla rotate, with upper lobe broader.

TRIBE VII. **EUPHRASIEÆ.** All, or at least the lowest, leaves opposite. Inflorescence centripetal, racemed. Corolla bilabiate, the upper lip concave or helmet-shaped. Stamens 4, didynamous, anther-cells distinct, usually mucronate at base.

* *Calyx bibracteolate at base.*

11. SIPHONOSTEGIA ♃ Tall plants. Leaves oblong-lanceolate. Flowers purple.
12. BUNGEA. ♃ Tufted plants. Leaves linear. Flowers yellowish.

* * *Calyx not bracted at base.*

13. EUFRAGIA. ⊙ Capsule oblong or lanceolate, somewhat compressed. Leaves ovate or oblong, crenate or palmatilobed.

14. TRIXAGO. ⊙ Capsule ovate, turgid. Leaves oblong-lanceolate to linear, serrate-dentate.

15. ODONTITES. ⊙ Capsule oblong, compressed. Leaves lanceolate-linear to linear.

16. RHYNCHOCORUS. ♃ Capsule orbicular. Corolla with a proboscis-like process.

17. RHINANTHUS. ⊙ Capsule orbicular, compressed. Leaves oblong-lanceolate.

1. VERBASCUM, L. MULLEIN.

Calyx 5-cleft or -parted. Corolla rotate, with 5, more or less unequal lobes. Stamens 5, with unequal filaments, the upper three or all woolly. Anthers 1-celled, attached transversely to filament, reniform, or the lower two decurrent, adnate lengthwise to filament. Style 1 ; stigma club-shaped. Capsule septicidal, 2-valved and 2-celled at tip ; seeds wrinkled — Tall, usually woolly, rarely green, biennials or perennials, with sessile or decurrent stem-leaves.

* *Anthers of longer stamens adnate-decurrent. Flowers (in ours) solitary, racemed.*

1 subnivale, 2 Blattaria.

* * *Anthers all reniform, nearly equal.*

† *Flowers in racemes composed of clusters.*

‡ *Flowers sessile or nearly so. Calyx .004 to .01 long.*

§ *Wool of filaments white or yellow. Corolla yellow or purplish.*

3 V. glomeratum, 4 Antiochium, 5 Amanum, 6 simplex, 7 Syriacum, 8 Antari, 9 Karyeteini.

§ § *Wool of filaments violet or purple. Corolla yellow.*

10 V. Aintabicum, 11 ptychophyllum, 12 Cæsareum, 13 Galilæum, 14 Palmyrense.

‡ ‡ *Pedicels not longer than calyx. Calyx usually less than .006 long.*

§ *Wool of filaments white or yellow.*

15 V. eriorrhabdon, 16 Sinaiticum, 17 Aliciæ.

§ § *Wool of filaments violet or purple.*

18 V. Tripolitanum, 19 sinuatum, 20 Gadarense.

§ § § *Wool of filaments unknown as yet.*

21 V. Qulebicum.

‡ ‡ ‡ *Pedicels longer than calyx. Calyx .002 to .003 long.*

§ *Wool of filaments white or yellow.*

22 V. Saltense, 23 Cedreti, 24 Barbeyi.

§ § *Wool of filaments violet or purple.*

25 V. Damascenum.

† † *Flowers solitary, racemed. Calyx scarcely .002 long.*

26 V. Germaniciæ.

† † † *Flowers solitary or the lower twin, racemed. Calyx longer than .002.*

‡ *Pedicels not longer than calyx.*

27 V. rotundifolium, 28 fruticulosum, 29 Schimperianum, 30 Tiberiadis, 31 Aleppense, 32 infidelium, 33 macranthum.

‡ ‡ *Pedicels much longer than calyx.*

34 V. Porteri, 35 Berytheum, 36 Blancheanum, 37 scaposum.

Species of doubtful affinity, or imperfectly known.

38 V. chryserium, 39 Gileadense.

1. V. subnivale, Boiss. et Haussk. ② .6 to 1, woolly, yellowish-green ; stem simple, ending in a .3 to .4 long, dense, spike-like raceme. Leaves crenate, yellowish-canescent at lower, greenish at upper surface, the radical long-petioled, cuneate at base, oblong to oblong-lanceolate, obtuse to acute and long-acuminate, the cauline numerous, lanceolate, sessile, half-clasping, the uppermost *caudate-acuminate.* Flowers solitary ; pedicels as long as calyx ; lower bracts similar to upper leaves, several times as long as calyx, upper subulate, gradually diminishing in length ; calyx woolly, .005 to .008 long, cleft to three-fourths its length into lanceolate-subulate lobes ; corolla yellow, .02 broad, tomentellous ; *filaments with whitish-yellow wool ;* capsule oblong, as long as calyx — September — Top of Akher-Dagh, and northward.

2. V. Blattaria, L. ② Moth Mullein. .5 to.6, *green, glabrous,* slender ; stem simple or branched above. Leaves oblong to oblong-lanceolate, the lowermost petioled, entire to sinuate-pinnatifid ; the others cordate-clasping, obtuse to acute. *Raceme loose ;* corolla yellow, violet or white at throat ; *filaments bearded with violet wool ;* pedicel longer than capsule — Summer — Rich, moist places ; near Antilebanon (Tristram).

3. V. glomeratum, Boiss. ② 1 to 2, *densely pannous,* yellowish grey, stout, *thyrsoid-paniculate.* Leaves nearly entire, the lower often .3 to .4 long, .08 to .1 broad, lanceolate, nearly sessile, tapering at base, the upper cordate, somewhat auricled at base, ovate, acuminate. Spikes loose, interrupted, flowers in clusters of 3-5 ; bracts triangular, shorter than calyx ; calyx .01 long, cleft nearly to base ; capsule less than half as large as a pea — Summer — Dry hills ; Aintâb to Soff Dagh, and northward.

4. V. Antiochium, Boiss. ② 1 to 1.5 ; stem *red, glabrescent,* simple, or sparingly branched, ending in a long, *widely-interrupted raceme.* Leaves obsoletely crenate, green and tomentellous at upper-surface, woolly-canescent at lower, the lowermost oblong, .25 long, cuneate at base, the others ovate, cordate-clasping, growing smaller. Flowers .01 broad, in clusters of 5-6, which are often .02 apart ; calyx .006 to .008 long, cleft for two-thirds of its length into triangular-lanceolate lobes ; capsule as large as a small pea — Summer — Hanging from walls of Antioch ; rocks ; Lebanon, Antilebanon, and northward.

5. V. Amanum, Boiss. ② .6 to 1, greenish-grey ; stem tomentellous below, *loosely hispid with branching wool above,* ending *in a spreading panicle.* Leaves woolly-canescent at lower surface, tomentellous at upper, ovate-oblong, the lower .05 to .25 long, .03 to .08 broad, petioled, crenate, the upper obsoletely crenate or entire, those of panicle cordate-clasping, smaller. Flowers .01 broad, in clusters of

3-4, separated below, crowded above ; calyx .006 long, *cleft to base ;* capsule .005 long, oblong — August and September — Amanus.

6. V. simplex, Labill. ♃ .6, *pannous-canescent ;* stems leafy below, ending in a sparingly branched panicle, or a simple, widely interrupted raceme. Lower leaves *obovate*, long-petioled, .02 to .05 long, upper ovate to oblong, sessile, smaller, often cuspidate, uppermost acute. Flowers .01 broad, in clusters of 2-5, the lowermost often .03 to .05 apart ; calyx .005 long, cleft nealy to base ; capsule .003 to .004 long, *woolly* — May to July — Lebanon, Cœlesyria, and Antilebanon to Palmyra and Aleppo.

7. V. Syriacum, Schrad. ♃ .6 to 1.5, grey-tomentellous, *panicled above.* Leaves somewhat crenate or entire, obovate to oblong, the lower petioled, .1 long, the upper sessile, rounded, clasping at base, mucronate, the uppermost acute. Flowers .015 broad, in clusters of 3-6, the lower clusters often .03 to .04 apart ; calyx .006 long, cleft for two-thirds of its length ; capsule .004 long, tubercled — April to June — Aleppo to Aintâb and Marash.

8. V. Antari, Post. (Plant. Post. II. 16). ♃ 1 or more, *densely pannous*, many stemmed, stems leafy below, ending in a very long, simple or 2-4-branched, interrupted raceme. Radical leaves crenulate, small, obovate, sinuate, petioled, cauline sessile, ovate-oblong to orbicular .03 to .1 long, crenate, cordate at base, half-clasping ; bracts cordate-ovate, acute. Flowers 2-4 in a cluster ; calyx .01 to .012 long, pannous, cleft for two-thirds of its length ; corolla yellow ; capsule woolly, ovate-globular, shorter than calyx — July — Marbat-'Antar.

9. V. Karyeteini, Post. (Plant. Postian. II 17). ♃ Many-stemmed, pannous ; stems simple, *ending in a dense, long spike.* Lower leaves small, obsoletely crenulate, elliptical, petioled, lower cauline short petioled, upper sessile, all oblong-ovate, sinuate-crenate, cuneate to cordate at base, .05 to .1 long. Flowers sessile or short-pedicelled, 3-5 in a cluster, *clusters contiguous ;* calyx .01 to .012 long, cleft for three-fourths of its length ; corolla yellow, .015 broad ; capsule woolly, ovate, half as long as calyx — July — Qaryeteîn.

10. V. Aintabicum, Post. (Plant. Post. II. 17). ② 1 or more, pannous below, *beset with detersile wool above*, ending in a broad panicle .1 or more long. Leaves firm, the lowermost yellowish, densely pannous, short-petioled, elliptical, acutish, entire, .2 to .25 long, .1 broad, the cauline sessile, oblong, greenish, white along the prominent nerves, beset with short, detersile wool, the uppermost cordate-auriculate, clasping. Flowers .025 broad, yellow, 2-3 in a cluster, the clusters .01 to .02 distant ; bracts ovate-acuminate ; calyx pannous, .01 to .013 long, cleft for three-fourths of its length ; capsule * * — June — Aintâb.

11. V. ptychophyllum, Boiss. ② .4 to 2.5, yellowish-white, pannous, many-stemmed from neck ; stems simple or 1-2-branched, forming interrupted racemes. Root-leaves obovate-oblong, petioled, .06 to .1 long, *wavy and sinuate-lobed ;* cauline oblong, sinuate and crenate-dentate to entire, *long-decurrent ;* bracts cordate-triangular. Flowers .01 broad, 3-4 in a cluster, clusters .02 to .03 apart ; calyx .006 to .008 long, cleft to three-fourths of its length ; capsule .004 long, ovate — June and July — Mar Saba to Moab, Antilebanon and Palmyra.

12 V. Cæsareum, Boiss. ② 1 to 1.5, *red, at length glabrous below;* stem simple or sparingly branched at the base of the .4 to .5 long, *dense spike.* Leaves green, yellow-puberulent, especially at lower surface, prominently nerved, the radical .15 to .3 long, .06 to .1 broad, oblong-elliptical, cuneate or rounded at base, cauline ovate-oblong, cordate-clasping. Flowers yellow, .01 broad, 3-5 in a cluster, clusters crowded; bracts as long as calyx; calyx .008 to .01 long, cleft for two-thirds of its length; capsule .005 long, *fine-tubercled* — July to September — Galilee to Lebanon, Antilebanon, and Cassius.

13. V. Galilæum, Boiss. ② 1 to 2 or more, greyish-woolly, especially about inflorescence, *long-panicled above.* Leaves greenish to grey, the lower oblong, .4 to .6 long, .1 to .25 broad, repand-lobed, crenate-dentate, the upper ovate to oblong, cordate-auricled, *often narrowed above base.* Flowers .02 broad, yellow, 3-5 in a cluster, clusters .01 to .03 apart; bracts ovate, acuminate; calyx woolly, .006 to .01 long, cleft for three-quarters of its length; capsule * * — April to June — Shady and rich places; coast and lower mountains.

14. V. Palmyrense, Post. (Plant. Postian. V. 12). ② .3 or more, pannous with yellowish-grey wool, detersile above; stem sparingly branched above middle. Lower leaves obovate, petioled, entire, .05 to .1 long, upper cordate-ovate to *orbicular*, half-clasping at base. Flowers sessile, 1-4 in a cluster, forming loose spikes; calyx .003 long, woolly, cleft nearly to base; corolla yellow, .02 broad; filaments purple-bearded; capsule ** — April — Flanks of the hill on which is the mediæval castle, Palmyra. Described from a single, immature specimen.

15 V. eriorrhabdon, Boiss. ② .6 to 1, stem and inflorescence *snowy with flocculent, at length detersile wool*, simple or sparingly panicled above. Root-leaves in a dense rosette, rounded, *elliptical to ovate and oblong*, crenate, petioled, obtusely *short-pointed, thick, very densely felted with silvery-white wool;* stem-leaves sessile, *cordate-obovate to cordate-ovate, half-clasping.* Flowers .02 broad, 3-5 in a cluster, forming a loose spike; bracts linear; calyx woolly, at length glabrous, .004 long, cleft to base; capsule oblong-cylindrical, .005 long, *mucronate* — June — Akher Dagh.

Var. **insulare**, Boiss. All the parts larger; root-leaves .05 to .15 long, .04 to .1 broad; fruiting calyx .006 long; clusters many-flowered — Akher Dagh.

16 V. Sinaiticum, Bth. ② *Kherma.* 1 or more, densely pannous with *golden or rusty wool*, long-panicled. Leaves thick, crenate, the lower oblong, .3 to .4 long, .06 to .08 broad, tapering at base; the upper ovate, tapering at tip, somewhat cordate-clasping, *and sometimes decurrent at base.* Flowers *white*, .01 broad, 3-5 in a cluster, forming interrupted spikes often .4 long; pedicels woolly, unequal, the longest scarcely longer than calyx; calyx .005 long, cleft for two-thirds of its length into oblong-lanceolate lobes; capsule ovate, .006 long — Summer — Antilebanon; Jaulân; Gilead; around Dead Sea; Sinai.

17. V. Aliciæ, Post. (Plant. Postian. III. 14). ♃ .5 to .6, stellate-woolly; stems numerous, wand-like, simple or sparingly branched. Leaves entire, the lower oblong-spathulate, .06 to .1 long, with petiole as long as limb, the upper sessile, lanceolate, cordate-

clasping at base, acute and acuminate. Clusters 2-3-flowered below, 1-flowered above, remote, pedicels as long as ovate, acuminate bract and calyx ; calyx .004 long, cleft nearly to base ; corolla .01 broad ; capsule ovate-globular, .005 long, woolly, at length glabrous — July — Wadi Ibrîsah, above el Hurmul (Lebanon).

18. V. Tripolitanum, Boiss. ② 1 to 2 ; stem glabrescent, turning black, ending in a broad panicle. Sterile rosettes rusty-pannous, fertile leaves yellowish-green ; lower leaves .3 to .5 long, oblong to oblanceolate, petioled, crenate-lobed to crenate, upper oblong-lanceolate, *not decurrent.* Flowers 3-4 in a cluster, clusters distant, bracts cordate-acuminate ; pedicels shorter than calyx ; calyx .006 long, cleft beyond middle ; corolla yellow, .02 broad ; capsule ovate, scarcely longer than calyx — Summer — Coast to 1000 m. in mountains ; common.

FIG. 263.



Flower and capsules of V. Tripolitanum.

19. V. sinuatum, L. ② 1 to 2, more or less densely woolly, yellow or grey ; stem ending in a long, broad panicle. Root-leaves *oblong-spathulate*, .3 to .5 long, nearly sessile, sinuate-pinnatifid, *usually wavy;* upper leaves oblong, *entire*, acute, *short-decurrent.* Flowers 2-5 in distant clusters, bracts cordate-acuminate ; pedicels unequal, the longest as long as calyx ; calyx .003 long, cleft beyond middle ; capsule globular, rather shorter than calyx — Waysides and sterile places ; common.

20. V. Gadarense, Post. (Plant. Postian. Fasc. VI). ② 1-2. stem red, clothed with appressed, detersile wool, *nearly two-winged by means of decurrent leaves.* Leaves of rosettes yellowish, densely beset with appressed, stellate wool, oblong, .15 to .35 long, more or less lobed or crenate, at first wavy then flat ; stem-leaves appressed-stellate-tomentellous, the lower oblong, *long-decurrent*, more or less lobed, crenate, the floral cordate-triangular, acuminate, less decurrent, with obsoletely crenate margin or entire. Flowers .02 broad, 1-8 in distant clusters, bracts diminishing ; pedicels as long as calyx or shorter ; calyx .003 long, appressed-stellate-puberulent, split to base into ovate-lanceolate lobes ; corolla yellow, *glandular-punctate at outer surface*, hirtulous; filaments purple-woolly ; capsule ovate spherical, twice as long as calyx — July and August — M-Kès (Gadara).

21. V. Qulebicum, Post. (Journ. Linn. Soc. Bot. XXIV. p. 437). ② 1 to 2 ; stem stout, ending in a panicle .3 to .4 long and broad. Leaves *cobwebby-fleecy*, the radical .2 to .4 long, .06 to .15 broad, oblong, tapering at base, acutish, crenate-serrate and lobed, sessile ; uppermost leaves sessile, *rounded at base*, lanceolate-acuminate. Flowers 2-5 in a cluster, *minute*, pedicels longer than calyx ; calyx in flower .002 long, split nearly to base ; corolla * * ; capsules smaller than a pea, ovate-spherical, longer than calyx ; fruiting clusters as large as a filbert — June — In pumice on flanks of Jebel Qulêb (Ḥaurân).

22. V. Saltense, Post. (Plant. Postian. V. 13). ♃ 1 or more, appressed-grey-puberulent, several-stemmed; stems panicled, with wand-like branches. Lower leaves oblong-spathulate, undivided, .15 to .2 long, tapering to a petiole, crenate-serrate ; stem-leaves oblong-lanceolate, cordate at base, acute, uppermost cordate, acuminate. Clusters 2-5-flowered, about .015 distant ; bracts minute, triangular ; longer pedicels longer than calyx; calyx .002 long, cleft to base; corolla yellow, .008 broad ; filaments yellow-woolly ; capsule globular, mucronate, .0025 long, puberulent — April — Es-Salt (Gilead).

23. V. Cedreti, Boiss. ② .5 to .8, wool of leaves appressed, permanent, of stems and inflorescence at length deciduous ; panicle commencing nearly at base. Root-leaves oblong, .06 to .15 long, .02 to .04 broad, tapering to a petiole, crenulate, often coarse-sinuate-lobed ; leaves of sterile rosettes elliptical, crenate, thick ; upper leaves *oblong*, sessile, acute to acuminate. Flowers 2-4 in distant clusters, bracts *setaceous ;* calyx .003 long, at length glabrous, cleft to base ; corolla yellow, .01 broad ; capsule cylindrical, .006 to .008 long, .002 to .003 broad — Summer — Alpine and subalpine Lebanon and Antilebanon.

24. V. Barbeyi, Post. (Journ. Linn. Soc. Bot. XXIV. p. 436). ② 1 or more, pannous with yellow, detersile wool ; stem simple or sparingly branched. Root-leaves petioled, elliptical, .3 to .5 long, .2 to .3 broad, crenate-serrate, *sparingly stellate-pubescent at upper surface*, woolly-canescent at lower ; stem-leaves * *. Flowers 2-5 in a cluster, *forming a loose spike* .3 to .5 long ; pedicels as long as calyx or longer; calyx .003 to .004 long, cleft nearly to base, corolla hirsute without, .015 to .02 broad ; capsule globular, .004 in diameter — Summer — Top of mountain above Hassan Beyley (Amanus).

25. V. Damascenum, Boiss. ② .5 to .8 ; stem woolly, at length glabrous, panicled. Sterile rosettes composed of densely pannous, very thick, yellowish leaves, obovate to elliptical and ovate, the largest .1 to .2 long, .04 to .1 broad, crenulate, tapering to a petiole ; lower leaves of fertile stems obovate to orbicular, petioled ; upper oblong to ovate, sessile, uppermost acuminate. Flowers 1-4 in scattered clusters ; bracts minute, setaceous ; pedicels somewhat longer than calyx ; calyx .002 to .003 long, cleft nearly to base ; corolla .006 broad; capsule oblong, .006 to .008 long, .002 to .003 broad — Summer — Hermon and Antilebanon to alpine regions ; Damascus, Yebrûd, Palmyra, Amanus, and eastward.

26. V. Germaniciæ, Haussk. ② .5 to .6 ; stems *red*, pubescent below, panicled almost from base, with slender, glabrous branches. Lower leaves *obovate-spathulate*, tapering to a petiole, crenulate, thick, pannous, upper oblong, tapering to a short petiole, tomentellous, entire. Flowers solitary ; bracts *minute, ovate ;* pedicel filiform, twice as long as calyx ; *sepals oblong-spathulate ;* corolla .005 broad ; filaments purple-bearded ; capsule .003 long, oblong — June — Amanus to Marash and Aintâb.

27. V. rotundifolium, Post. (Plant. Postian. II. 18). ♃ .5 or more, *rusty-grey*, pannous, *panicled almost from base.* Root-leaves oblong-spathulate in outline, .1 to .2 long, tapering to a petiole, sinuate-pinnatifid, with rounded, crenate lobes ; stem-leaves oblong to *orbicular*, .02 broad, sessile, *cordate-clasping*, crenate, *reticulate-nerved.*

Flowers solitary, short-peduncled ; sepals oblong ; capsule ovate-globular, woolly, .005 long, about as long as calyx — June — Jebel Husha' (Gilead) ; plain of Haurân.

28. V. fruticulosum, Post. (Plant. Postian. Fasc. VI). ♃ .3 to .6, woody at base, *densely pannous* with stellate wool. Leaves thick, crenate, the lower oblong, .03 to .1 long, obtuse, wavy-margined, the upper ovate-lanceolate, cordate-clasping at base, acute, the floral ovate-cordate, short-acuminate. Flowers solitary, short-peduncled, .015 to .018 broad ; bracts lanceolate, acuminate, a little shorter than calyx ; calyx .006 long, split nearly to base into lanceolate, acute lobes ; corolla yellow, densely stellate-tomentellous ; filaments purple-woolly ; anthers kidney-shaped ; capsule woolly, soon glabrescent, spherical, mucronate, *shorter* than calyx — July and August — Wadi-en-Nâr, between Jerusalem and Mar Saba.

29. V. Schimperianum, Boiss. ② Pannous, *rusty-yellow.* Leaves mostly at neck, crowded, oblong, .04 to .1 long, obtuse, tapering into a short petiole, obtusely sinuate-lobed, wavy-margined. Panicle almost from base, much branched, *leafless except* 1-2, *scale-like, ovate-cordate leaves.* Racemes long, slender ; flowers solitary, short pedicelled ; calyx scarcely .003 long, woolly, cleft to middle ; filaments dirty white-woolly ; capsule ovate, mucronate, somewhat longer than calyx — Spring — Sinai.

30. V. Tiberiadis, Boiss. ② .6 to 1, appressed-papillose below, glandular-woolly above ; stem stout, densely leafy below, broad-panicled above. Root-leaves short-petioled, oblong to oblong-lanceolate, .15 to .3 long, pinnatifid into irregular, triangular-lanceolate, dentate lobes ; middle leaves sessile ; upper cordate, acuminate, denticulate. Pedicels shorter than calyx ; bracts small, triangular-cordate ; calyx .003 long, cleft nearly to base ; capsule ovate-globular, .006 long — May — Around Lake of Tiberias and Banias.

31. V. Aleppense, Benth. ② .3 to .6 ; stem simple, leafy below, *racemed or thyrsoid-panicled above.* Leaves of sterile rosette canescent, imbricated, oblong, wavy-sinuate, .06 to .1 long ; of fertile stems more densely woolly at lower surface, the lower oblong-lanceolate, *dentate or cut-lobed*, petioled, the upper sessile, somewhat cordate-clasping, plaited, oblong-lanceolate, acuminate. Inflorescence *glandular ;* bracts *triangular-oblong*, as long as pedicel ; calyx .005 long, cleft nearly to base ; filaments purplish-woolly ; capsule ovate, .005 long — Aleppo, and north-eastward.

32. V. infidelium, Boiss. et Haussk. ② .5 to .8, many-stemmed, leafy-below ; *stems simple or sparingly branched above, beset with sessile glands, and long, spreading, rigid hairs.* Leaves *undivided*, crenate ; radical white-pannous, oblong, acute, tapering into a short petiole ; cauline sessile, half-clasping, lanceolate-acuminate. Bracts *lanceolate*, as long as pedicel ; *inflorescence hispid ;* calyx .005 long, parted into lanceolate, often *acuminate* lobes ; filaments yellowish woolly ; capsule ovate, shorter than calyx — Summer — Near Marash.

33. V. macranthum, Post. (Plant. Postian. Fasc. VI). ♃ 1 to 1.3, woody at base, stem yellowish, appressed-woolly, *winged below, the wings coarsely serrate-lobed*, simple or sparingly branched above ; branches long, wand-like. Leaves woolly, the lower cauline

and those of sterile branches oblong, .04 to .07 long, .01 to .02 broad, short petioled, coarsely round-lobed and crenate, obtuse ; stem-leaves sessile, the lower *ovate*, .04 to .07 long, .02 to .04 broad, decurrent, the upper cordate-ovate, acuminate, clasping at base, crenate-serrate. Flowers .04 to .05 broad, solitary, sessile, forming interrupted or rather dense spikes ; bracts cordate-ovate, acuminate, about as long as calyx ; calyx .01 to .014 long, densely woolly, split nearly to base into lanceolate lobes ; corolla yellow, glabrous and sparingly glandular-punctate without ; filaments purple-woolly ; anthers reniform ; capsule *larger than a pea*, spherical, tomentellous, *half as long as* calyx — July and August — In the valley between M-Kès and Ard-el-Hammeh.

34. V. Porteri, Post. (Plantæ Postian. II. 18). ♃ .6 to .8, stellate-hairy below, *beset with stipitate glands above ;* root woody, cylindrical ; stems numerous, tall, panicled almost from base. Leaves obtuse, the radical linear-spathulate, crenate, tapering into a long petiole, the cauline few, oblong, sessile. Bracts minute, *triangular ;* flowers solitary, on ascending peduncles, 5-6-times as long as calyx ; calyx .0025 long, cleft to base ; corolla .008 broad, yellow ; wool of filaments purple ; capsule oblong-ovate, mucronate, .008 long, twice as long as calyx — July — Between 'Asâl-el-Ward and Deir-'Atîyeh (Antilebanon Plateau).

35. V. Berytheum, Boiss. ② .3 to .6, green, hirtellous-glandular, with oblong, tuberous root, racemed or panicled above. Root-leaves rosetted, .1 to .13 long, oblong-spathulate, *pinnatisect-lyrate, lower segments small, ovate, terminal ovate or oblong, irregularly sinuate-lobed ;* stem-leaves *oblong to lanceolate*, more or less dentate. Pedicel 3-6 times as long as calyx ; bracts minute, lanceolate-acuminate ; calyx .003 to .004 long, with elliptical lobes ; corolla .02 broad ; capsule *longer* than calyx lobes — Spring — Hedges and roadsides, common along Phœnician coast ; lower Lebanon.

36. V. Blancheanum, Boiss. ② .3 to .6, green, papillose-hispid, somewhat glandular above, with short, nearly cylindrical root, racemed or short-panicled above. Root-leaves rosetted, .08 to .12 long, *oblong, with triangular-denticulate lobes ;* stem-leaves sessile, *triangular, auricled, acuminate*, cut-toothed. Pedicel *thrice* as long as calyx, bracts minute, triangular-acuminate ; calyx .005 to .006 long, with rhombic-elliptical, mucronate lobes ; corolla .02 broad ; capsule *overtopped by growing* calyx-lobes — Spring — Hedges and roadsides, Phœnician coast. Perhaps a mere variety of the last.

37. V. scaposum, Boiss. ② .4 to .6, glabrous, with ovate-oblong, tuberous root, and nearly naked stem, ending in a *simple raceme.* Root-leaves rosetted, .03 to .05 long, *ovate, obtuse, irregularly crenate*, short-petioled. Stem-leaves .01 long, *linear, somewhat hastate-auricled* at base. Pedicels 4-6-times as long as calyx ; bracts minute, triangular-ovate, acuminate ; calyx .003 long, with oblong lobes ; corolla * * capsule .005 long, *twice as long as* calyx — Spring — Pine woods ; Cassius and Amanus.

38. V. chryserium, Schrad. ② Densely *yellow-woolly* ; stem simple or panicled above. Leaves entire, the lower obovate-lanceolate, obtuse, tapering into a petiole, the upper sessile, cordate-clasping.

Branches of panicle ascending ; flowers 4-5 in a cluster ; pedicels as long as calyx ; calyx-lobes oblong-ovate, acutish ; corolla yellow ; filaments *glabrous ;* anthers reniform ; capsule ovate-spherical, longer than calyx — Near Arimithæa (Er-Ramah).

39. V. Gileadense, Post. (Journ. Linn. Soc. Bot. XXIV. p. 437). ② 1 or more, appressed-woolly ; *stem 2-winged above from decurrent leaves.* Root-leaves appressed-woolly at lower surface, sparingly stellate-pubescent at upper, oblong, .3 to .4 long, .06 to .1 broad, irregularly incised-lobed and dentate, wavy-margined, *lyrate toward base ;* stem-leaves woolly, oblong, sessile, obtuse, dentate, *decurrent for nearly the whole length of the internode ;* upper-leaves lanceolate, acute — June — Fields ; Wadi-es-Sîr (Gilead). I have not seen flowering or fruiting specimens.

21. CELSIA, L. Celsia.

Calyx 5-cleft or parted. Corolla rotate, with 5, nearly equal lobes. Stamens 4 ; filaments bearded ; anthers all reniform, or the two of the longer filaments adnate decurrent. Style 1 ; stigma club-shaped. Capsule septicidally 2-valved, 2-celled. Seeds wrinkled-pitted —Hairy or glabrescent herbs or shrubs.

* *Anthers of longer stamens adnate-decurrent. Leaves opposite.*

1. C. glandulosa, Bouché. ② Glandular-pubescent ; stem leafy, ending in a long, loose, simple raceme. Leaves opposite, all except the uppermost petioled, lyrate, segments 3-4 pairs, ovate-oblong, acutely double-serrate, often remote, minute, the terminal ovate, obtuse ; the uppermost leaves small, sessile, ovate, acuminate. Pedicels filiform, horizontal, with small, triangular-ovate, acuminate, acute-toothed bracts ; calyx .004 long, with oblong lobes ; capsule twice as long as calyx, somewhat smaller than a pea — March and April — Nahr-el-Kelb ; Haifa.

2. C. alpina, Boiss. et Ky. ♃ .15 to .25, hairy, viscid, pale green ; root-stock woody ; stems brittle, simple, leafy, ending in a loose raceme. Leaves opposite, the lower long-petioled, ovate, .02 to .04 long, obtuse, doubly crenate-dentate, sometimes lyrate with small, ovate, lateral lobules ; upper-leaves sessile, ovate. Pedicels filiform, horizontal or deflexed, 4-5-times as long as calyx ; calyx glandular, .003 long, with oblong lobes — June — Rocks ; valley of Manshûrah (Antilebanon) 1800 m.

* * *All the anthers reniform, inserted at middle.*

3. C. glandulifera, Post. (Plant. Postian. II. 19). ♃ .5 to .8, *white-woolly below,* stipitate-glandular above ; root-stock woody ; stems panicled almost from base. Leaves alternate, the lower oblong, .05 long, .01 broad, tapering into a petiole, serrate, the upper oblong-lanceolate, obtuse. Pedicels solitary, somewhat longer than calyx, spreading in flower, curved upward in fruit ; bract minute, round-ovate, mucronate ; calyx .002 long, parted to base ; corolla yellow, .008 broad ; filaments purple bearded ; capsule ovate-spherical, mucronate, once and a half as long as calyx — July — Fields near Marbaṭ 'Antar (Palmyrene Desert).

4. C. parviflora, Dec. ♄ *Nefleh.* .15 to .2, opposite-branched. Leaves .01 to .015 long, .004 broad, opposite, the lower *woolly-canescent*, oblong-lanceolate, somewhat repand, short-petioled, the upper sessile, linear, *brownish-purple, as also the twigs.* Racemes opposite or alternate, .07 long, few-flowered, loose ; pedicels twice to thrice as long as calyx, filiform ; bracts minute, linear ; calyx .002 long, with elliptical, acute, glandular-margined lobes ; corolla .005 broad ; capsule globular — Ghor-es-Safieh, and southward to Sinai.

5. C. pinetorum, Boiss. ② .6 papillose-hispid below and at leaves ; stem slender, ending in a spreading, glandular panicle. Leaves alternate, the lower .05 long, petioled, lyrate-pinnatisect, the lateral segments few, small, triangular, the terminal ovate-oblong, acutely cut-lobed and dentate, the upper undivided, nearly sessile ; the uppermost cordate-clasping, triangular-ovate, acutely dentate, acuminate. Pedicels capillary, many times as long as calyx ; bracts *minute, ovate, cuspidate ;* calyx .003 long, with elliptical-lanceolate lobes ; corolla .02 broad ; capsule a half longer than calyx — June — Woods ; mountains of Gilead ; pines between Kessab and Suêdîyeh.

6. C. heterophylla, Desf. ② .5 to 1.5, glabrous except at hispidulous base, spreading-paniculate above. Leaves alternate, *lowest pinnatisect with oblong, crenate, remote segments, often intermixed with lobules,* the terminal oblong-lanceolate, longer ; intermediate leaves nearly sessile, with narrower, acute lobes ; the uppermost half-clasping, ovate, acuminate. Pedicels 4-5 times as long as calyx ; bracts *cordate-deltoid, undivided, acuminate,* the lower as long as pedicels, the upper much shorter ; calyx .002 long, with oblong lobes ; corolla .006 to .008 broad ; capsule .003 in diameter, globular, a third longer than calyx — Summer — By water ; Gilead to Lake Phiala, eastern slopes of Lebanon, Cœlesyria, and Antilebanon, Aintâb, Marash, and northward and eastward.

7. C. Orientalis, L. ⊙ .3 to .5, tomentellous, green ; stem densely leafy, simple, or sparingly panicled. Leaves ovate-oblong in outline, *bipinnatisect into minute, oblong, divergent, often lobulated lobes ;* upper sessile, pinnatisect *into few, linear* lobes. Pedicel *shorter* than calyx ; bracts pinnatisect into linear-lobes, entire or linear, longer than calyx ; calyx .005 long, with linear lobes ; corolla .006 croad ; capsule oblong-ellipsoidal, .005 long, .003 broad, *shorter* than calyx — March to June — Hillsides and fields ; common.

Fig. 264.



Segment of flowering branch of C. Orientalis.

3. LINARIA, Juss. Toad-Flax.

Calyx 5-parted, with nearly equal lobes. Corolla personate, with spur at base of tube, throat sometimes closed by prominent palate, sometimes open ; upper lip erect, bifid, lower reflexed, 3-lobed. Stamens 4, didynamous ; anther-cells oblong. Capsule globular or ovate, with 2, equal or slightly unequal cells, variously dehiscent or ruptured at apex. Seeds ovate or prismatic, with variously marked testa, or discoid, membranous-margined — Herbs or shrubs.

* *Throat closed by a palate. Cells of capsule opening by lids. Flowers less than .015 long.*

† *Annual, prostrate. Leaves orbicular and ovate to hastate.*

1 L. spuria, 2 lanigera, 3 Elatine, 4 Græca.

† † *Perennials.*

5 L. floribunda, 6 Ægyptiaca, 7 macilenta.

* * *Throat closed by a palate. Cells of capsule opening at tip by* 4-6, *tooth-like valves.*

† *Seeds discoid, membranous margined.*

‡ *Perennials, with yellow flowers* .016 *to* .025 *long.*

8 L. Aucheri, 9 Damascena.

‡ ‡ *Annuals flowers violet or yellow,* .005 *to* .015 *long, in terminal heads.*

10 L. Pelisseriana, 11 arvensis, 12 micrantha.

† † *Seeds oblong, reniform, or 3-angled, not margined.*

‡ *Glabrous-glaucescent perennials. Seeds 3-angled.*

13 L. Dalmatica, 14 genistifolia, 15 coridifolia.

‡ ‡ *Glabrous or glandular-pubescent annuals. Seeds angled or reniform.*

16 L. triphylla, 17 Chalepensis, 18 Hælava, 19 Ascalonica, 20 albifrons.

* * * *Throat of corolla open. Cells of capsule dehiscent by teeth, or irregularly torn. Annuals.*

21 L. minor, 22 pterospora, 23 Persica.

1. L. spuria, L. ⊙ *Finely villous.* Leaves alternate, short-petioled, entire, or lowest somewhat dentate, round-ovate. Pedicels *twice or thrice* as long as axillary leaf ; calyx-lobes *ovate-oblong ;* corolla *yellow, with violet upper-lip ;* seeds with gyrate pittings — June to September — Fields ; coast to subalpine Lebanon and Cœlesyria.

2. L. lanigera, Desf. ⊙ *Woolly-villous.* Leaves alternate short-petioled or nearly *sessile,* entire or repand, upper *round-cordate,* acute. Pedicels *shorter* than axillary leaf to a little longer, calyx-lobes *lanceolate, acute ;* corolla *yellowish violet ;* seeds reticulate-pitted — June to November — Fields ; coast and maritime ranges of mountains to subalpine regions.

Var. **villosissima,** Post. Villous-canescent ; branches stiff ; leaves all short-petioled, longer than flowers — M-Baghik (Dead Sea).

FIG. 265.



Segment of branch of L. lanigera.

3. L. Elatine, L. ⊙ *Hairy.* Lowest leaves opposite, the rest alternate, short-petioled, ovate, the uppermost *hastate,* acute. Pedicels capillary, *several times* as long as axillary leaf ; calyx-lobes lanceolate, *very acute ; corolla white, with purplish upper and yellowish lower lip ;* seeds pitted-reticulate — January to August — Fields ; Jordan Valley ; coast ; lower mountains.

4. **L. Græca,** Bory et Ch. ⊙ Hairy. Lowest leaves opposite, ovate to oblong, upper alternate, *minute*, *ovate-triangular.* Pedicels capillary, *many times longer* than axillary leaf, *tendril-like*, *curved at apex;* calyx-lobes lanceolate, very acute; corolla *yellowish-blue* or *yellow;* seeds tubercled — May to October — Fields; coast and lower mountains of maritime range.

5. **L. floribunda**, Boiss. ♃ *Ashy-hirsute;* root-stock woody; stems prostrate, naked at base, densely leafy above, ending in spikes often .15 long. Leaves small, tapering into a short petiole, the *lower rhombic-elliptical, entire, or with a small tooth near middle, upper linear*, .01 long, .002 to .004 broad, *overtopping flowers.* Pedicels capillary, *shorter than calyx;* corolla yellow, with a hooked-recurved spur; seeds tubercled — Spring — Deserts of southern Palestine.

6. **L. Ægyptiaca,** L. ♄ *Duwainet-el-Fâr. 'Ushb-el-Dîb. Dureisheh. Mujennineh. Rîhah. Jawîm.* .15 to .3, *pubescent*, much branched from base and above; branches stiff, *elongated*, at length spinescent. Leaves .005 to .02 long, the lower *oblong*, *obtuse*, the upper *triangular-hastate.* Racemes *leafy;* pedicels capillary, *longer than leaves, flexed at tip*, at length spinescent; calyx-lobes lanceolate, acute; corolla .01 long; seeds *glandular-tubercled* — Spring — Nazareth to Tiberias, Moab, el-Ghor, valleys around Dead Sea, and southward and eastward.

7. **L. macilenta,** Sec. ♄ *Halâweh.* .3 to .6, *glabrous;* branches stiff, *sparingly leafy*, with *short*, at length spinescent twigs. Lower leaves *ovate to linear-lanceolate*, .02 long, .004 to .006 broad, *entire or sagittate at base*, the uppermost awl-shaped, entire. Racemes terminal, loose, short-bracted; pedicels capillary, 2-4 times as long as calyx; calyx-lobes awl-shaped; corolla .013 to .015 long; seeds tubercled-echinate — Spring — Jebel Hârûn, and southward to Sinai.

8. **L. Aucheri,** Boiss. ♃ .3 to .5, glabrous; stems simple or fastigiate-branched above. Leaves crowded, .03 to .05 long, .006 broad, linear-lanceolate, not clasping at base, 1-3-nerved. Spikes *at length rather loose;* calyx-lobes *nerveless*, ovate-oblong; corolla .016 to .018 long, palate hirsute — May to July — Alpine and subalpine Lebanon, Antilebanon, and Cœlesyria.

Var. **augustifolia,** Post. Leaves linear, .001 to .0025 broad — Subalpine Lebanon.

Var. **fastigiata,** Post. Leaves .001 to .004 broad. Plant fastigiate above — Cedars of Lebanon.

9. **L. Damascena,** Boiss. et Gaill. ♃ .3 to .8, glabrous-glaucescent, many- or 1-stemmed; stems leafy, ending in a simple raceme, which is elongated and *rather dense in fruit.* Leaves alternate, linear-lanceolate, nearly 3-nerved, *the midrib not grooved above.* Calyx-lobes ∞-nerved, oblong-elliptical; corolla .02 to .025 long, palate minutely pruinose — Spring and summer — Dry hills; Haurân to Damascus, and subalpine regions of Antilebanon.

10. **L. Pelisseriana,** L. ⊙ .2 to .5, glabrous; fertile stems erect, simple, or sparingly branched. Leaves of shoots *oblong*, whorled; of stems *remote*, *linear to awl-shaped.* Corolla *violet*, .015 long, *including spur which is as long as limb* — Spring — Sands and fields, along coast, and to middle Lebanon.

11. L. arvensis, L. ⊙ .15 to .3, glaucescent, glabrous below ; fertile stem or stems erect, simple or sparingly branched. Leaves *linear.* Corolla .005 to .008 long, *including* subulate *spur which is half as long as limb* — April to June — Lebanon and Antilebanon.

Var. **flaviflora**, Boiss. Corolla yellow, sometimes violet-striped — Sandy places and fields ; Aleppo to Aintâb, and northward ; Arabia Petræa ; Moab.

12. L. micrantha, Cav. ⊙ .05 to .15, glaucous ; fertile stems 1 or several, simple. Leaves of sterile shoots linear, of stems *oblong-lanceolate* in threes, or opposite, or alternate. Corolla .003 long, *blue, scarcely longer than calyx; spur very short, conical* — Spring — Fields ; Jaffa ; Antilebanon, Damascus, Ḥems, and northward.

13. L. Dalmatica, L. ♃ .3 to .6, simple or paniculate. Leaves *ovate, oblong, or lanceolate, half-clasping.* Pedicels *as long as or longer than calyx;* calyx-lobes broad-lanceolate ; corolla .02 long, with villous palate ; spur straight, *shorter* than limb — Summer — Waste places ; Ḥaurân ; Aintâb to Akherdagh, and northward.

Var. **grandiflora,** Boiss. Corolla .04 long — Aintâb ; Ṣûf-dagh.

14. L. genistifolia, L. ♃ .3 to .8, paniculate. Leaves *lanceolate to oblong-linear* and *linear.* Pedicels *shorter than calyx;* calyx-lobes lanceolate ; corolla .007 to .012 long, with bearded palate ; spur straightish, *as long as or shorter than* limb — Summer — Waste fields ; Mt. Cassius, and northward.

Var. **linifolia,** Boiss. Leaves linear-lanceolate to linear. Flowers scattered — Amanus, and northward.

15. L. coridifolia, Desf. ♃ .2 to .3, *many-stemmed.* Stems slender, erect, simple or fastigiate-branched. Leaves *crowded, subulate,* .01 to .02 long. Pedicels shorter than bracts and calyx ; calyx-lobes lanceolate, acute ; corolla .008 long, *pale greyish-violet,* spur as long as tube — Summer — Aintâb, and northward.

16. L. triphylla, L. ⊙ .3, glabrous ; stems simple or branched. Leaves rather fleshy, sessile, *ovate to lenticular or elliptical,* obtuse, those of the shoots opposite, of the stem 3-*whorled.* Spike terminal, *dense in flower,* lax in fruit ; flowers sessile or nearly so ; calyx-lobes ovate-oblong, obtuse ; corolla *tricolored or blue,* .015 long, spur curved upward, nearly as long as limb ; capsules ovate, .006 long — Spring — Khan Lejjûn (Megiddo) ; Moab.

17. L. Chalepensis, L. ⊙ .2 to .5, *glabrous,* stems erect, simple or branching, ending in a *loose raceme.* Leaves of shoots and lower stem-leaves *oblong or lenticular,* opposite, the remainder linear, .02 to .04 long, alternate. Pedicels shorter than calyx and linear bracts ; calyx-lobes linear, spreading, acute, *about as long as corolla-limb;* corolla .015 long, white, upper lobes linear-oblong ; spur subulate, *once and a half to twice as long as limb;* capsules ovate, .004 long; seeds angled, wrinkled — Spring — Common.

18. L. Hælava, Forsk. ⊙ *Nimwâr. Shuqeirah. Ṣufeirah.* .05 to .25, branching from base, glabrous below ; *inflorescence glandular-pubescent.* Leaves linear, rather fleshy, .01 to .03 long, in *whorls of four or three, or opposite, or alternate.* Racemes *nearly capitate,*

ovate in flower, elongated in fruit ; pedicels shorter than oblong bract and calyx ; calyx-lobes ovate-oblong, *much shorter than corolla-limb* ; corolla .015 long, *violet, yellow, or variegatel*, with *broad, inflated palate ;* spur subulate, *longer* than limb ; capsules .003 long ; seeds *minute, reniform* — Spring — Borders of Et-Tîh, and southward ; top of Wall of Jerusalem ; Jericho ; Gaza.

19. L. Ascalonica, Boiss. et Ky. ⊙ .1 to .3, glabrous ; stems erect, flexuous, branching from base. Leaves of shoots crowded, opposite, linear-oblong, .01 long ; of stems and branches filiform-linear, .01 to .03 long. Racemes terminal, very loose, *few-flowered ;* pedicels stiff, as long as calyx ; bract subulate ; calyx *glabrous*, lobes linear, membranous-margined ; corolla .007 long, yellow ; spur *as long as* limb ; capsules .003 long, once and a half as long as calyx, seeds minute, transversely wrinkled. Spring — Philistine plain to Et-Tîh, and southward to Sinai.

Var. **brachyloba**, Post. Capsule as long as calyx — Ruins of Palmyra.

20. L. albifrons, Sibth. et Sm. ⊙ .06 to .12, glabrous, glaucescent, simple or branching from neck ; stems simple or sparingly branched. Leaves *oblong-lanceolate* to oblong, *tapering at* base, .004 to .007 broad, lowest in threes or opposite. Flowers .006 to .008 long, few, *nearly capitate*, at length loosely spiked ; bract linear, nearly as long as calyx ; calyx-lobes linear-oblong, *nearly as long as corolla ;* corolla *whitish, with violet tube, and yellowish palate ;* capsule .005 long, *as long as or longer than* growing calyx ; seeds ovate, obtuse, punctate-pitted — Spring — Jericho, Judæa and Philistia to Et-Tîh, and northward and eastward ; ruins of Palmyra.

21. L. minor, L. ⊙ .1 to .2, glandular-hairy, branching from base and above. Leaves oblong to linear-lanceolate, tapering to a petiole or the upper sessile, mostly alternate. Racemes *leafy, very loose, flexuous, few-flowered ;* pedicels *twice to four times as long as calyx ;* calyx-lobes linear-spathulate, rather longer than capsule ; corolla .004 to .005 long, *bluish ;* spur *conical, one-third to one-half* as long as limb ; capsule ovate, glandular, .003 to .004 long, ribbed ; cells *unequal, each opening by three valves at apex ;* seeds ribbed lengthwise, tubercled — May to August — Aintâb, and northward.

22. L. pterospora, Boiss. ⊙ .1 to .2, glandular-pubescent, stems single or branching below, forked. Leaves oblong to oblong-lanceolate, obtuse. Racemes long, flexuous ; pedicels 1-3 times as long as calyx ; bract twice as long as calyx ; calyx-lobes linear-spathulate, longer than capsule ; corolla bluish-pink, twice as long as spur ; capsule ovate, glandular, little longer than style ; seeds oblong, *winged* along ribs — Spring — Ziaretdagh (Amanus).

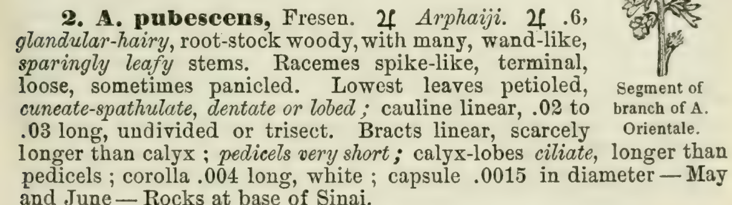
23. L. Persica, Chav. ⊙ .1 to .2, more or less pubescent, simple or sparingly branched. Leaves rather fleshy, ovate to oblong or elliptical, the upper sessile. *Flowers nearly sessile*, distant, loosely spiked, .01 long ; bract about as long as calyx ; calyx-tube *crisp-woolly*, lobes oblong-spathulate, about as long as corolla ; corolla bluish-pink, spur .001 to .002 long, incurved ; capsule velvety, globular, long-mucronate, with equal, irregularly torn cells ; seeds transversely pitted between longitudinal ribs — Spring — Aleppo to Aintâb, and northward.

4. ANARRHINUM, Desf. ANARRHINUM.

Calyx deeply 5-cleft. Corolla tubular, bilabiate, not spurred at base, with throat not closed by palate ; lobes of upper lip erect, at length deflexed, those of lower spreading. Anthers kidney-shaped, with confluent cells. Capsule globular, with equal cells, dehiscent by a dorsal, oblong, 1-valved pore. Seeds ovoid, wingless, tubercled or muricate — Perennial, erect herbs.

1. A. Orientale, B'th. ♃ .5 to .8, *glabrous*, root-stock woody, with many, wand-like, *leafy* stems. Racemes spike-like, terminal, loose, sometimes panicled. Lowest leaves petioled, *obovate-oblong, entire or dentate ;* cauline sessile, linear-lanceolate to linear, .02 to .03 long, undivided or 3-sect. Bracts linear, the lower as long as flowers; calyx-lobes *glabrous*, as long as pedicels ; corolla .005 long, white ; capsule .002 in diameter — Summer — Common, expecially in mountains, throughout.

FIG. 266.



Segment of branch of A. Orientale.

2. A. pubescens, Fresen. ♃ *Arphaiji.* ♃ .6, *glandular-hairy*, root-stock woody, with many, wand-like, *sparingly leafy* stems. Racemes spike-like, terminal, loose, sometimes panicled. Lowest leaves petioled, *cuneate-spathulate, dentate or lobed ;* cauline linear, .02 to .03 long, undivided or trisect. Bracts linear, scarcely longer than calyx ; *pedicels very short ;* calyx-lobes *ciliate*, longer than pedicels ; corolla .004 long, white ; capsule .0015 in diameter — May and June — Rocks at base of Sinai.

5. ANTIRRHINUM, L. SNAP-DRAGON.

Calyx 5-parted, with nearly equal lobes. Corolla personate, saccate at base, the upper lip erect, bifid or bipartite, the lower spreading, trifid, the palate broad, closing the throat. Stamens 4, didynamous, with two, oblong anther-cells. Capsules ovate or pear-shaped, oblique, with unequal, many-seeded cells, the upper opening by one, the lower by two, many-toothed pores. Seeds wingless — Annual and perennial herbs.

* *Annuals, with flattened seeds keeled at back, dentate along inner margin.*

1. A. Orontium, L. ⊙ *Saisam.* .5 to .8, stems erect or sparingly branched. Leaves short-petioled, oblong to linear-lanceolate, and linear. Flowers solitary, axillary, almost sessile, forming an interrupted, spike-like raceme ; calyx-lobes *linear, as long as or longer than* .01 long purple corolla — Spring — Fields ; common throughout, even to Sinai.

Var. **brevifolium**, Post. Leaves .01 to .02 long.

* * *Perennials often with woody base. Flowers solitary, opposite, or 3 in a whorl. Seeds obovate, pitted-crested.*

2. A. majus, L. ♃ .6 to 1, tortuous, branching at base ; branches straight, densely leafy. Leaves linear-lanceolate to linear, tapering at both ends. Racemes .2 to .3 long, *axis glandular-hairy ;* calyx *glandular-hairy* with ovate lobes ; corolla .03 long, five to six times as long as calyx — Summer — Walls ; along coast ; Antilebanon.

Var. **angustifolium**, Chav. Leaves narrowly-linear — Coast ; Ḥasbeiya.

3. A. tortuosum, Bosc. et Chav. ♃ .6 to 1, tortuous, branching at base ; branches straight, densely leafy. Leaves lanceolate to linear, tapering at both ends. Racemes .05 to .1 long, *glabrous ;* calyx *glabrous*, with ovate-oblong, obtuse lobes ; corolla .03 long, 5-6 times as long as calyx — Summer — Walls of Castle of esh-Shuqîf.

Probably a glabrous variety of the last. A specimen from the walls of Rumeli-Hissar, near Constantinople has the long raceme of A. majus, with the glabrous inflorescence of A. tortuosum.

6. SCROPHULARIA, L. Figwort.

Calyx 5-parted. Corolla-tube inflated, urn-shaped, rarely short-cylindrical, with bilabiate limb, the upper four lobes erect, the lower spreading. Stamens 4, didynamous, declined, with the anther-cells transverse, confluent ; a rudimentary fifth stamen (sometimes wanting) forms a scale-like appendage between the uppermost lobes of the corolla. Capsule 2-celled, many-seeded, at length septicidal, with valves entire or bifid at apex. Seeds ovoid or oblong, transversely wrinkled — Rank herbs, with small, greenish or lurid flowers, more or less paniculate.

* *Pedicels usually longer than calyx. Leaves undivided, with anastomosing veins.*

1 S. peregrina, 2 Scopolii, 3 Nusairiensis, 4 Antiochia, 5 alata, 6 macrophylla.

* * *Pedicels usually as long as or longer than calgx (in S. tagetifolia* 3-4 *times as long). Leaves with few or no anastomosing veins, generally more or less cut or divided, sometimes undivided.*

† *Leaves, at least the lower, opposite.*

‡ *Scale orbicular, half-orbicular, or reniform.*

¶ *Biennials.*

7 S. scariosa, 8 tagetifolia, 9 Michoniana, 10 lucida 11 sphærocarpa.

¶ ¶ *Perennials.*

12 S. xylorrhiza, 13 heterophylla, 14 xanthoglossa, 15 deserti.

‡ ‡ *Scale ovate-oblong, oblong, or oblong-linear. Perennials.*

16 S. Gileadensis, 17 Peyroni, 18 variegata, 19 Syriaca.

1. S. peregrina, L. ⊙ .5 to .8, glabrous, stem nearly doubly simple-toothed. Leaves .03 to .06 long, coarsely serrate, sometimes *cordate-ovate*, the uppermost truncate or cuneate at base. Cymes peduncled, loosely 2-5-flowered, forming a loose, somewhat leafy panicle, often .3 to .5 long ; pedicels twice to thrice as long as calyx ; bracts setaceous ; calyx-lobes *ovate-lanceolate, not margined ;* corolla *red ;* scale

ovate-orbicular ; capsule .005 long, ovate-globular — Spring — Roadsides, and waste places ; common.

2. S. Scopolii, Hoppe. ② .4 to .8, stem obtusely 4-angled. Leaves dotted, ovate-oblong, cordate, petioled, .03 to .05 long, *more or less pubescent*, obtusely or acutely crenate-dentate, with apiculate teeth, the upper truncate or cuneate at base. Panicle oblong, often .3 long, leafless or with a few leaves near base, bracts *linear-lanceolate ;* pedicels *glandular*, about twice as long as calyx ; calyx-lobes *ovate-orbicular, white-margined ;* corolla *greenish-purple ;* stamens included, scale broader than long ; capsule ovate-globular, .004 long — Spring — Woods and rocky places ; Nusairy mountains to Amanus, and northward.

3. S. Nusairiensis, Post. (Plant. Postian. Fasc. V. p. 13). ② .4 to .8 or more, stem obtusely quadrangular. Leaves ovate-cordate to oblong, obtuse to acute, doubly serrate or lobuled to dentate. Panicle composed of distant, loosely thyrsoid branches, terminal thyrsus oblong ; leaves of panicle small, oblong-linear ; pedicels sparingly glandular, *twice to thrice* as long as calyx ; calyx-lobes orbicular, white-margined ; corolla *brownish-purple ;* scale broader than long ; longer *stamens exserted on filaments nearly as long as corolla ;* capsule as large as a small pea, depressed-globular, mucronate —Spring —Baniâs (Nusairy Mountains).

4. S. Antiochia, Post. (Plant. Postian. Fasc. V. p. 13). ② ♃ .5 to 1, stem quadrangled, not *winged.* Leaves petioled, ovate to ovate-oblong, the lower coarse-serrate and dentate, the upper dentate. Panicle elongated, loosely thyrsoid ; leaves of panicle *subulate ;* pedicels once and a half as long as calyx ; calyx-lobes *oblong-elliptical ;* corolla ** ; capsule .002 long, .0025 broad, mucronate, *scarcely longer than calyx* — June — Ḥuseinîyeh (Antioch). Perhaps a small fruited variety of the last.

5. S. alata, Gilib. ♃ 1 or more, nearly glabrous ; root fibrous ; stem 4-angled, winged especially near the base of the winged petiole. Leaves oblong-ovate, *rounded or obscurely cordate at base, serrate.* Panicle elongated, nearly leafless ; pedicels *sparingly glandular ;* calyx-lobes *orbicular*, scarious-margined ; corolla greenish brown ; scale *obcordate-bilobed* — April to July — Wet places ; Lebanon to Aintâb, Marash, and northward.

Var. **crenata,** Post. Leaves crenate. Panicle shorter — Marash.

Var. **cordata,** Boiss. Leaves cordate — With type.

6. S. macrophylla, Boiss. ♃ 1 to 2, glabrous ; root fibrous ; stem 4-angled, *nearly wingless*, simple or sparingly branched. Lower leaves .05 to .2 long, oblong-lanceolate, coarsely crenate-dentate, cordate and often somewhat lobed at base. Panicle thyrsoid, interrupted ; nearly leafless ; pedicels *nearly glabrous ;* calyx-lobes *ovate, obtuse*, scarious-margined ; corolla lurid ; scales *transversely semilunar*, rounded ; capsule ovate, mucronulate, .004 long, twice as long as calyx — Spring — Wet places ; common.

7. S. scariosa, Boiss. ② .6 to 1, glabrous ; stem simple, ending in a narrow thyrsus .3 or more long. Leaves (resembling those

of Datisca cannabina), bipinnatisect into narrow-lanceolate, acute, acutely incised leaflets, in upper leaves linear-lanceolate. Cymes short, 5-7-flowered ; bracts and bracteoles *ovate-oblong, broadly scarious-margined ;* calyx-lobes with *broad, scarious, wavy, blistered* margin ; corolla *blackish purple,* scale round ; capsule ovate-conical, acuminate, twice as long as calyx — Spring — Aleppo to Aintâb.

8. S. tagetifolia, Boiss. et Haussk. ② .6 to 1, glabrous ; stem simple or branched, ending in a long, loose thyrsus. Leaves 1-2-pinnatisect into short-lanceolate, acutely incised-dentate leaflets, axis often bearing minute leaflets. Cymes *rather long peduncled,* 7-15-flowered ; bracteoles not scarious ; *pedicels* 3-4 *times as long as calyx ;* calyx-lobes with *denticulate,* scarious margin not as broad as herbaceous portion ; corolla *purple ;* appendix reniform, capsule long, mucronate, scarcely longer than calyx — Spring — Aleppo to Aintâb.

9. S. Michoniana, Coss. et Kralik. ② 1 to 1.5, glabrous excépt glandular inflorescence. Stem *red,* angled, simple or sparingly branched, ending in a loose thyrsus .3 to .6 long. Leaves pinnatisect into ovate-oblong, obtusely-dentate, or lyrate segments, the lowest *often with a leaflet at base of petiole, the upper decurrent.* Cymes short-peduncled, 2-7-flowered ; bracts and bracteoles *setaceous,* not scarious-margined ; calyx-lobes ovate, with a *red, crisp, wavy* margin, *as broad as they ;* corolla *yellowish ;* scále small, round ; capsule as large as a pea, abruptly long-mucronate — April to August — Common.

Var. **tenuisecta,** Boiss. Subdivisions of leaves smaller and more dissected. Thyrsus short — Common.

10. S. lucida, L. ② .5 to .8, glabrous ; stem obtusely tetragonal, ending in a long, minutely glandular thyrsus. Leaves thickish, the lowest small, ovate, lobed, the others 2-pinnatisect into oblong, incised-dentate segments, those of upper leaves narrower. Cymes bifid, 3-7-flowered ; flowers short-pedicelled ; bracts linear, short ; calyx-lobes orbicular, scarious margined ; corolla *blackish-purple,* lobes orbicular, the upper larger ; *longer stamens exserted ;* scale half-round ; capsule as large as a small pea, *acuminate-mucronate,* twice as long as calyx — Spring — Between Hebron and Jerusalem ; Ḥasbeiyah.

11. S. sphærocarpa, Boiss. et Reut. ② 1 or more, glabrous, glossy ; stem red, obtusely 4-angled, ending in an elongated, *spreading,* slightly glandular panicle. Leaves thickish, the lower *lyrate-pinnatifid,* the others bipinnatisect, with *divaricating, oblong, obtuse, obtusely dentate* segments. Cymes 5-7-flowered, flowers *nearly sessile ;* bracts *short,* linear ; calyx-lobes orbicular, with broad, scarious margins ; corolla purple, scale *reniform ;* capsules .003 in diameter, globular, *apiculate* — May — Lower and middle zones of Lebanon, Cœlesyria, and Antilebanon, to Amanus, Aintâb, and northward.

12. S. zylorrhiza, Boiss. et Haussk. ♃ .06 to .16, minutely glandular or glabrescent ; root-stock woody ; stems numerous, brittle, simple, somewhat angled, ending in a narrow thyrsus, leafy near base. Leaves .01 long, ovate-oblong, acutely incised-dentate, cuneate at base, undivided, or lyrate, or pinnatisect into oblong, decurrent segments ; floral-leaves minute. Cymes short-peduncled, 5-1-flowered ; bracteoles oblong ; calyx-lobes ovate, narrow-margined ; corolla campanulate, thrice as long as calyx ; scale round-ovate ; capsule globular, nearly

twin, apiculate, twice as long as calyx — Summer — Clefts of rocks; Palestine; Aleppo, Aintâb, and northward.

13. S. heterophylla, Willd. ♃ Glabrous, usually glaucescent; stems many, ascending, fragile, from a woody root-stock, ending in a leafless, pyramidal, many-flowered thyrsus. Leaves somewhat fleshy, petioled, ovate, obtuse, cuneate or truncate or subcordate at base, obtusely incised-crenate, undivided or lyrate-pinnatifid or partite, the lateral segments 1-2, much smaller. Cymes loosely 5-9-flowered; bracteoles scale-like; pedicels as long as calyx; calyx-lobes ovate, with a broad, white margin; scale reniform; capsule nearly *thrice* as long as calyx, globular, apiculate, somewhat twin — April to June — Wadi-Mûsa and Mt. Hor.

14. S. xanthoglossa, Boiss. ♃ .4 to 1, glabrous-glaucescent; stems erect, rigid, *expanding from middle into a long, thyrsoid or much branched panicle.* Leaves thickish, rather fleshy, the lowest obovate-cuneate obtusely crenate, or fan-shaped, incised, the others pinnately cut, with dentate lobes, those of the lower leaves minute, oblong, obtuse, of the upper lanceolate to linear, acutely denticulate. Cymes short-peduncled, bifid, branches *at length elongated, rigid, loose, many-flowered;* bracts and bracteoles linear, the latter as long as calyx; calyx-lobes round, white margined; corolla .005 long, *thrice as long as calyx,* upper lobes round, large, narrowed at base; scale *large, yellow, often as large as upper corolla-lobes, with a crenulate margin;* stamens more or less exserted; capsule .003 to .004 long, ovate-spherical, mucronate, twice to thrice as long as calyx — Spring and summer — Common to subalpine regions. A variable species.

Var. **genuina,** Boiss. Flowers somewhat larger. Upper corolla-lobes broader. Filaments long exserted.

Var. **decipiens,** Boiss. Flowers rather smaller. Upper corolla-lobes smaller. Filaments less exserted.

Var. **hispidula,** Boiss. Upper part of plant papillose-glandular.

15. S. deserti, Del. ♃ *Zeiteh.* .4 to .5, glabrous except the minutely glandular inflorescence; stems slender, sparingly leafy, ending in a panicle or thyrsus. Leaves small, thick, cartilaginous at margin, petioled, ovate to lyrate *with obtuse lobes*, the upper sessile, pinnatipartite into oblong to linear-spathulate, obtuse, obtusely crenate or dentate lobes. Cymes short-peduncled, bifid, 3-9-flowered; bracts and bracteoles scale-like; flowers minute; pedicel shorter than calyx; calyx-lobes orbicular, narrowly white-margined; corolla twice as long as calyx, its upper lobes small, round; anthers nearly included; scale orbicular; capsule small, twice as long as calyx — Spring — Sinai, at el-Bustân; Wadi el-'Arabah.

FIG. 267.



Flower and capsule of S. deserti, maguified 2 diameters.

16. S. Gileadensis, Post. (Journ. Linn. Soc. Lond. Bot. Vol. XXIV. p. 438). ♃ .5, glabrescent or minutely glandular above, woody at base, with numerous, wand-like stems, ending below their middle in a loose thyrsus. Leaves petioled, the lowest oblong, .01 to

.02 long, pectinate-toothed, the others .02 to .04 long, oblon, pinnatisect into *linear lobes, entire, or* 1-2-*acute-toothed.* Cymes peduncled, bifid, 3-9-flowered ; bracts and bracteoles *setaceous ;* flowers .008 long ; pedicels as long as calyx ; calyx-lobes orbicular, white-margined ; corolla brownish-purple, *urn-shaped,* 3-4-*times as long as calyx, the upper lobes inflexed ;* anthers included ; scale ovate, 1-2-dentate ; capsule * * —May — Thickets ; Ṣûf to 'Ajlûn (Gilead).

17. S. Peyroni, Post. (Plant. Postian. Fasc. V. p. 14). ♃ 1, glabrous, stems numerous, rigid, branching almost from base into intricate, spreading panicles. Leaves 1-2-pinnatipartite into linear lobes .004 to .009 long. Cymes short-peduncled, bifid ; flowering *racemes elongated, rigid, loosely* 10-20-*flowered ;* bracts and bracteoles linear, the latter a little longer than short pedicels ; flowers scarcely .004 long ; calyx minute, lobes round, scarious-margined ; corolla thrice as long as calyx, upper-lobes medium-sized, narrowed at base, rounded ; stamens scarcely exserted ; appendix *small, ovate-oblong, pale-yellow, with entire margin ;* capsule small, mucronulate, twice as long as calyx — May to July — Fissures of rocks ; Beirût ; Antilebanon.

18. S. variegata, M.B. ♃ *'Inabeh.* .3 to .5, *pruinose-punctate, or pubescent,* rarely glabrescent ; stems reddish, simple or sparingly branched, ending in a loose, leafless thyrsus. Leaves oblong-ovate, deeply pinnatifid or parted into lanceolate to linear, incised-dentate lobes. Bracts and bracteoles elliptico-linear, the latter minute ; cymes short-peduncled, the latter 5-1-flowered ; flowers .005 long ; calyx-lobes orbicular, white-margined ; corolla *variegated, urn-shaped ; scale ovate-spathulate to oblong ;* capsule .002 to .004 long, *oblate-spheroidal,* apiculate, thrice as long as calyx — June to September — Hermon ; mountains south of Qaryetein ; Marash, and northward.

Var. **Libanotica,** Boiss. Glabrous except sparingly glandular thyrsus. Leaves dentate, petioled or nearly sessile, rarely incised — Sinai ; subalpine and alpine Lebanon and Antilebanon to Cassius, Amanus, Kurd Dagh, and northward.

Var. **crenata,** Post. Leaves repand-crenate to crenate — Roots of Mt. Cassius.

† † *Leaves small, scattered, scale-like, oblong, entire or dentate.*

19. S. Syriaca, Benth. ♃ .3, glabrous, shrubby at base, many stemmed, *almost leafless,* dichotomously branched, ending in depanperated thyrsi. Leaves .01 long, entire. Cymes short-peduncled, bifid, 3-5-flowered ; bracts and bracteoles minute, triangular ; flowers sessile, small ; calyx-lobes orbicular, white-margined, stamens included ; scale small ; capsule * * — Spring — Nazareth.

7. LINDENBERGIA, Lehm. Lindenbergia.

Calyx tubular or campanulate, somewhat unequally 5-toothed. Corolla elongated, the upper lip concave, erect, retuse ; the lower larger, 3-lobed, with a 2-plaited projection at throat. Fertile stamens 4, the cells of the anthers stipitate. Style truncate-capitate at apex. Capsule oblong or ovoid, 2-grooved, loculicidal, the 2 valves entire, with median septa ; the placenta central, at length free, separable into 4 ; seeds numerous, minute — Nearly leafless, shrubby, desert herbs.

L. Sinaica, Dec. ♄ .5 to .6, glandular-hispid, with wand-like branches, ending in long, interrupted racemes of nearly sessile, opposite flowers. Leaves short-petioled, those of new branches .02 long, round or truncate at base, ovate-obtuse, coarsely crenate-dentate; the upper much smaller, .003 to .005 long, the floral nearly sessile, shorter than calyx. Corolla violet, .015 long, four times as long as calyx, throat bearded; capsule somewhat longer than calyx — Spring — Rocks; Ghor-es-Ṣafieh, and southward to Sinai.

8. DIGITALIS, L. Foxglove. *Kaff-eth-Tha'lab.*

Calyx 5-parted. Corolla declined, with inflated, campanulate or cylindrical tube, the upper lip short, retuse or bifid, the lower trifid, with longer middle lobe. Stamens 4, didynamous, included, inserted at bottom of corolla; cells of anthers divergent, confluent at apex. Style short, 2-lobed. Capsule ovate, septicidally 2-valved, valves entire with introflexed margins; the placental column often naked above. Seeds numerous, minute, oblong — Perennial herbs.

D. ferruginea, L. ♃ 1, stem leafy. Leaves glabrous or sparingly puberulent below and at margins, the lower oblong-spathulate, .15 to .25 long, .015 to .02 broad, the upper linear-lanceolate. Flowers short-peduncled; bracts linear-lanceolate, deflexed; calyx-lobes obovate-elliptical, scarious-margined; corolla .015 long, glandular-pubescent, *yellow*, *rusty-veined*, with abruptly inflated tube; lower lobe ovate, entire, or obscurely 3-lobed, about as long as tube, hairy within — Summer — Lebanon.

9. WULFENIA, Jacq. Wulfenia.

Calyx 5-parted. Corolla tubular-campanulate, with short, ascending, slightly bilabiate limb, the upper lip broader, bifid, the lower trifid. Stamens 2, filaments inserted in the notches between the lips; anthers reniform, with diverging cells, confluent at apex. Style capitate. Capsule oblong, septicidal and loculicidal. Seeds ovate, convex at back, concave at face — Perennial herbs, with most of the leaves radical, and scape-like racemes.

W. Orientalis, Boiss. ♃ Glabrous, except glandular, hairy axis and pedicels. Leaves rosetted, cartilaginous, oblong-spathulate, .15 to .25 long, short-petioled, doubly crenate, somewhat lobed. Scape naked, longer than leaves; spike at length elongated, loose; bracts linear-lanceolate, acute; pedicels twice as long as bracts, nodding above; calyx-lobes lanceolate; corolla-tube twice as long as calyx; capsule oblong, as long as calyx—Summer —Plains of Suedîyeh and Antioch.

10. VERONICA, L. Speedwell.

Calyx 4-5-parted. Corolla tube short or almost 0; limb spreading, 4-cleft, the upper lobe broader. Stamens 2, inserted on tube, exserted; anthers dehiscent by two longitudinal slits. Stigma entire. Capsule turgid, generally flattened, 2-celled, obtuse and generally retuse; seeds flattened or concave, inserted by inner face — Annual or perennial herbs, or somewhat shrubby plants.

* *Perennials.*

† *Racemes axillary, usually opposite.*

‡ *One or both valves of capsule separating at length from placental column.*

1 V. Anagallis, 2 anagalloides, 3 Beccabunga.

‡ ‡ *Valves adhering to placental column. Capsule usually margined.*

¶ *Capsule cuneate at base, obtriangular or obcordate.*

4 V. multifida, 5 Orientalis, 6 Aleppica, 7 cinerea, 8 Chamædrys.

¶ ¶ *Capsule rounded at base.*

9 V. stenobotrys.

† † *Racemes terminal. Valves adherent to placental column.*

10 V. cespitosa, 11 bombycina.

* * *Annuals. Flowers terminal or axillary. Valves coherent to placenta.*

† *Seeds plano-convex, more or less umbilicate at inner face.*

‡ *Pedicel shorter than calyx or little longer. Bilobed capsule shorter than calyx.*

12 V. arvensis, 13 viscosa.

‡ ‡ *Pedicel much longer than calyx. Capsule as long as calyx or longer.*

14 V. acinifolia, 15 conferta, 16 Reuteriana, 17 Syriaca.

† † *Seeds boat-shaped.*

‡ *Floral leaves, or at least the upper, bract-like. Erect or diffuse plants.*

18 V. triphyllos, 19 biloba, 20 campylopoda.

‡ ‡ *Floral leaves resembling the others. Diffuse, prostrate plants.*

21 V.Buxbaumii, 22 didyma, 23 Cymbalaria, 24 hederæfolia.

1. V. Anagallis, L. ♃ .1 to .8, glabrous or sparingly glandular above ; stems fistulous. Leaves sessile, *ovate to lanceolate and oblong*, serrate and entire. Racemes panicled ; bracts linear, longer than ascending pedicels ; calyx-lobes unequal, elliptical ; corolla white, a *little longer* than calyx — May to September — Wet places ; common throughout.

2. V. anagalloides, Guss. ♃ .3 to .4, glabrous or puberulent ; stems fistulous. Leaves sessile, *lanceolate-linear*, entire or sparingly denticulate. Racemes panicled ; bracts linear, longer than ascending pedicels ; calyx-lobes unequal, elliptical ; corolla white, *not longer* than calyx — Wet places ; less common than last, of which it should be considered a variety.

3. V. Beccabunga, L. ♃ .25 to .3, glabrous or glandular-puberulent above ; stems fistulous. Leaves rather fleshy, *petioled, oblong-elliptical*, obtusely crenate-serrate. Pedicels ascending, much longer than bracts; calyx-lobes ovate-lanceolate, shorter than pedicels, and *blue* corolla ; capsule nearly orbicular, somewhat retuse, a little longer than style — Summer — Wet places.

4. V. multifida, L. ♃ .2 to .4, crisp-puberulent ; stems decumbent or diffuse. Leaves sessile, *pinnatisect into entire or dentate, linear lobes.* Racemes 2-4-5 ; pedicels scarcely longer than calyx or shorter, stiff in fruit ; calyx-lobes 4-5, unequal ; corolla flesh-colored or pale blue, longer than calyx ; capsule glandular, about as long as calyx, cuneate at base, broader than long, *obsoletely obcordate or truncate* — Summer — Near Besherri. *Probably a mere pinnatisect variety of the following species.*

5. V. Orientalis, Mill. ♃ .3 to .5, crisp-puberulent, rarely glabrescent ; stems decumbent or prostrate. Leaves sessile, cuneate-oblong to lanceolate, *dentate-incised, rarely entire,* upper often oblong to linear, *often entire.* Racemes 2-4 from upper axils, short, loose in flower, and elongated in fruit ; pedicels scarcely longer than calyx ; calyx-lobes 4-5, *linear-lanceolate,* unequal ; corolla flesh-colored or pale-blue, longer than calyx ; capsule glandular-pubescent, cuneate at base, broader than long, *obcordate or truncate,* as long as calyx or longer — May to August — Rocky places ; alpine and subalpine regions of Lebanon, Antilebanon, Cassius, Amanus, Akherdagh, and northward.

Var. **tenuifolia,** Boiss. Upper leaves *oblong-linear to linear,* margin sometimes revolute, entire or sparingly denticulate —Lebanon ; Akherdagh ; mountains of Gilead.

Var. **polifolia**, Post. .05 to .15. Leaves oblong-spathulate to linear-spathulate, with revolute, crenate margins. Spikes short, dense. Capsules small — Alpine and subalpine Lebanon, and Antilebanon. (*V. polifolia, Bth.*).

6. V. Aleppica, Boiss. ♃ .2 to .4, *hirsute or woolly-canescent ;* stems decumbent or diffuse. Leaves flat, nearly sessile, tapering-cuneate at base, oblong to oblong-linear, regularly pectinate-toothed or incised. Racemes 2-4 from upper axils, dense, elongated in fruit ; bracts oblong-spathulate, nearly as long as calyx ; pedicels stiff, shorter than calyx ; calyx-lobes *linear-lanceolate,* unequal, usually 4 ; corolla flesh-colored, .008 broad ; capsule hirsute, *obtriangular, as long as broad. truncate, scarcely retuse, overtopped by calyx-lobes* — Woods ; Cassius, Amanus, Aleppo, and northward.

7. V. cinerea, Boiss. et Bal. ♃ .1 to .2, *velvety-canescent or ashy,* tufted ; stems prostrate or ascending. Leaves nearly sessile, *oblong to oblong-linear,* .005 to .014 long, tapering at base, crenate above, *with revolute margins.* Racemes 2-4 at summit of branches, .03 to .05 long, loose ; *pedicels longer than calyx and oblong-linear bract ;* corolla flesh-colored, longer than calyx ; calyx-lobes about equal, oblong ; capsule *obcordate-triangular, broader than long,* longer than calyx — Summer — Akherdagh, and northward.

8. V. Chamædrys, L. ♃ .3 ; stems ascending, with two, hairy lines above. Leaves pubescent, nearly sessile, *ovate, incised-crenate,* .01 to .02 long, truncate, or somewhat cordate at base. Racemes 2-4 from upper axils, loose ; pedicels about as long as bracts and calyx ; calyx-lobes 4, oblong-lanceolate, longer than capsule ; corolla .01 broad, blue, lower lobe white ; capsule obcordate-triangular, hairy, broader than long — Spring — North-eastern Syria.

Var. **pilosa,** Bth. Stems uniformly hirsute — Aintâb ; Marash.

9. V. stenobotrys, Boiss. et Bl. ♃ .3 to .5, *drying black;* stems crisp-hairy or glabrescent. Leaves sparingly hairy or glabrous, *oblong to oblong-ovate,* regularly and acutely incised-serrate, the lowest somewhat petioled, the upper subcordate at base. Racemes .15 long, narrow, pubescent or glabrous; bracts about as long as pedicels; calyx-lobes 4, linear, obtuse, with sometimes a fifth, minute lobe; corolla flesh-colored, .01 broad; capsule *nerved,* obcordate, *somewhat thickened at margin* — April to August — Middle mountain region of Lebanon, Cassius, Amanus, and northward.

Var. **leiocarpa,** Boiss. Glabrous throughout — Cassius and Amanus.

10. V. cespitosa, Boiss. ♃ Tufted, matted, stems filiform, tangled, naked, prostrate; branches .01 to .02 long, densely leafy; leaves more or less woolly, with revolute margins, *narrowly-linear,* .007 to .01 long. Flowers 1-4, scarcely exserted from tuft; pedicels as long as woolly calyx, and oblong-linear bracts; calyx-lobes oblong-linear, unequal; corolla large, pink; capsule .003 long, orbicular-obcordate, somewhat broader than long, about as long as calyx — Summer — Alpine Lebanon above Cedars.

11. V. bombycina, Boiss. et Ky. ♃ Dwarf, appressed *white-silky, tufted, matted;* stems brittle, naked; branches short, *densely leafy.* Leaves .004 long, *ovate to oblong-spathulate.* Flowers 1-5 terminal, pedicels shorter than calyx; bracts small, ovate; calyx-lobes oblong, obtuse; corolla *red,* twice as broad as calyx; capsule .002 long and broad, orbicular, somewhat cuneate at base, apex obtuse, scarcely retuse — June and July — Fissures of rocks; top of Jebel Makmel.

12. V. arvensis, L. ⊙ .1 to .3, diffusely branched, pubescent. Leaves nearly sessile, ovate with truncate or cordate base, crenate-toothed; floral sessile, lanceolate, entire. Racemes spike-like; pedicels shorter than calyx and bract; corolla minute, blue; calyx-lobes lanceolate; style as long as sinus; seeds 15-20 — April to June — Fields; rather rare along Phœnician coast; Aintâb, and northward.

13. V. viscosa, Boiss. ⊙ .05 to .1, *glandular-pubescent, drying-black,* branching from neck. Leaves nearly sessile, ovate-subcordate, obtusely crenate-toothed; *the lower* floral *oblong, toothed, the upper lenticular.* Racemes *hispid;* pedicels spreading, *longer than calyx and bract;* corolla blue, not longer than ovate-elliptical calyx-lobes; style as long as sinus; seeds 4 — Spring — Alpine and subalpine Lebanon, and Antilebanon; rare.

14. V. acinifolia, L. ⊙ .15, glandular-hairy, simple or branching from base and above. Leaves short-petioled, ovate, somewhat crenate; floral lenticular, entire. Racemes loose; corolla deep-blue; fruiting pedicels 3-4 times as long as calyx; capsule flattened, glandular-ciliate, longer than calyx, broader than long; *style as long as sinus;* seeds *smooth* — Spring — Fields and roadsides; Aintâb to Marash, and northward.

15. V. conferta, Boiss. ⊙ .03, *glabrous,* or crisp-hairy, simple or branching from neck. Leaves *minute, oblong, entire,* tapering at base, the upper floral as long as pedicels or shorter. Racemes short, few-flowered, corolla * *; fruiting pedicels *once to thrice* as long as

calyx ; capsule *glabrous*, .002 broad, about as long as calyx, broader than long ; style *one-third as long as sinus* — June — Fields ; alpine Lebanon.

16. V. Reuteriana, Boiss. ⊙ .02 to .04, glandular-hairy, simple or branching from base. Leaves subpetioled, small, *ovate-oblong, entire ;* floral *linear-spathulate*, as long as pedicel. Racemes short ; corolla * * ; fruiting pedicels horizontal, twice to thrice as long as calyx ; capsule glandular at margin, longer than calyx, *lobes diverging at a right angle ;* style *half as long as* 4-5-seeded cells — March to June — Moist clayey places ; Manshûra (Antilebanon) ; Damascus.

17. V. Syriaca, Ræm. et Sch. ⊙ .15 to .35, glandular-hairy, branching from base and above. Leaves ovate, crenate or dentate, the lowest petioled ; floral much shorter than pedicel, *linear-elliptical*, entire or sparingly toothed. Racemes loose ; corolla blue, .008 to .01 broad ; fruiting pedicels *many times* as long as calyx ; capsule flattened, glandular-ciliate, as long as calyx, broader than long ; style *once and a half to thrice as long as sinus ;* cells 8-10-seeded ; seeds *wrinkled* — January to May — Common in fields everywhere to subalpine regions.

18. V. triphyllos, L. ⊙ .1 to .25, sparingly pubescent, often diffuse. Lowest leaves ovate, petioled, undivided, intermediate *palmatisect into* 3-7-9, *oblong-spathulate lobes ;* floral *trisect* or undivided. Racemes loose ; pedicels as long as calyx and bracts, or longer, spreading ; calyx-lobes oblong, longer than blue corolla ; capsule glandular, .006 long, .008 broad, obcordate, about as long as calyx ; style *longer* than sinus — Spring — North-eastearn plains from Cœlesyria and Qaldûn, to Palmyra, Aintâb, and northward.

19. V. biloba, L. ⊙ .05 to .1, sparingly glandular-puberulent, simple or sparingly branched. Leaves *oblong, sparingly denticulate*, floral *lenticular*. Racemes at *first capitate, then loose, few-flowered ;* pedicels about as long as calyx and bracts ; calyx-lobes *ovate-lanceolate*, 3-*nerved, connate by pairs at base ;* corolla pale, shorter than calyx ; capsule glandular, cleft nearly to base into obovate, 2-3-seeded, divergent lobes, shorter than calyx ; style *much shorter* than sinus — May and June — Subalpine Lebanon.

20. V. campylopoda, Boiss. ⊙ .05 to .15, papillose-hairy, usually much branched from base. Leaves oblong-lanceolate to oblong, the lowest obsoletely crenate or dentate, the others entire ; the floral linear, as long as pedicels. Racemes loose ; pedicels usually longer than calyx, *recurved in fruit ;* calyx-lobes *short-connate in pairs, linear-lanceolate*, 3-nerved ; corolla pale, shorter than calyx ; capsule glandular, cleft nearly to base into obliquely obovate, divergent, 2-6-seeded lobes ; style *half as long as sinus* — Spring — Fields and sandy places ; Lebanon, Antilebanon, Qaldûn, Deir 'Atîyeh, Aintâb, and northward.

21. V. Buxbaumii, Ten. ⊙ Papillary-pubescent. Leaves orbicular to *ovate*, subcordate, coarsely crenate-serrate, the lower petioled ; the floral scarcely smaller. Pedicels *much longer than* leaves ; calyx-lobes *ovate-oblong*, in pairs, divaricating in fruit, longer than capsule ; corolla .01 broad, blue, broader than calyx ; capsule ciliate, reticulate, *twice* as broad as long, *with divaricate, obtusely-triangular lobes*,

keeled, cells 5-8-seeded ; style longer than lobes — Spring — Fields ; common.

22. V. didyma, Ten. ⊙ Sparingly pubescent. Leaves *round-ovate*, subcordate, petioled, crenate-serrate ; floral smaller. *Pedicels as long as leaves or shorter ;* calyx-lobes *broad-ovate*, more or less divaricating in fruit, longer than capsule ; corolla deep-blue, as broad as calyx; capsule densely tomentellous, broader than long, *notched*, inflated, cells 8-10-seeded ; style longer than sinus — November to May — Fields ; common.

23. V. Cymbalaria, Bod. ⊙ Hirsute with long papillæ. Leaves *semi-orbicular, subcordate or cuneate at base*, petioled, 5-11-crenate-lobed. Peduncles longer than leaves, spreading ; calyx-lobes *ovate* to *elliptical*, obtuse, *tapering at base*, open in fruit, ciliate ; corolla white, rotate, scarcely broader than calyx ; capsule inflated, didymous, 2-4-seeded, hirsute or glabrous ; style longer than sinus —Spring — Fields ; common throughout.

Var. **cymbalarioides,** Post. Glabrous or glabrescent. Peduncles *about as long as leaves ;* calyx-lobes sometimes furnished with a lateral lobe ; corolla *cream-colored ;* style scarcely longer than sinus — Fields ; with type. (*V. cymbalarioides, Bl.*).

24. V. hederæfolia, L. ⊙ Pubescent. Leaves nearly round, cordate or cuneate at base, 3-5-*lobed*, *terminal lobe larger*. Peduncles about as long as leaf or shorter, deflexed in fruit ; calyx-lobes *cordate-triangular*, *erect in fruit, longer than capsule ;* corolla white or pale-blue, shorter than calyx ; capsule glabrous, 4-*lobed*, cells 1-seeded ; style short — Spring — Fields ; common.

Var. **brevipedunculata**, Post. Peduncles shorter than calyx — Beirût, Hems.

11. SIPHONOSTEGIA, B'th. Siphonostegia.

Calyx bibracteate, tubular, many-ribbed, 2-lipped, the upper lip 3-, the lower 2-parted to base into oblong-linear, nearly equal lobes. Corolla tubular, bilabiate, long exserted, the upper lip helmet-shaped, retuse, the lower 3-lobed, the palate not gibbous, but more or less longitudinally 2-plaited. Stamens 4, nearly equal under the upper lip, with sagittate, muticous anthers. Capsule lanceolate, acute, scarcely compressed, included in calyx, loculicidal. Seeds numerous, nearly triquetrous — Tall perennials.

S. Syriaca, Boiss. et Reut. ♃ .6 to 1, pubescent, drying-black ; stems wand-like, simple or sparingly branched, ending in a long, spike-like, leafy raceme or panicle. Leaves nearly sessile, oblong-lanceolate, entire, tapering at base, floral linear-lenticular, as long as or longer than calyx. Flowers opposite, sessile, spreading ; bracteoles of calyx linear ; calyx 11-ribbed and grooved, lips one-fourth as long as tube ; corolla purple, with small limb — Summer — Shady rocks ; valley of the Orontes from Suedîyeh to Antioch ; Amanus, and northward.

12. BUNGEA, C. A. M. Bungea.

Calyx bibracteate, short-tubular, deeply cleft into 4, leaf-like lobes. Corolla tubular, the upper lip helmet-shaped, acuminate, with

a tooth at each side of base, lower lip acutely trifid ; palate biconvex. Stamens 4, didynamous under the hood ; anthers glabrous, transverse, with equal, mucronate cells. Capsule ovoid, acuminate, loculicidal below tip, valves leathery, bearing long, coherent, bifid, dilated septa dividing the cells nearly to their middle. Seeds few, large, attached laterally near base, oblong-triquetrous, with thickened margin — Tufted herbs with aspect of Ajuga chamæpithys.

B. trifida, Vahl. ♃ .1 to .15, hirsute ; stems brittle, numerous, from a woody rootstock, erect or decumbent, simple, densely leafy, spiked almost from base. Leaves, some linear, others tripartite into linear lobes. Flowers .02 long, subsessile ; bracts linear, as long as calyx ; calyx-lobes 1-nerved, linear, acute, rigid, much longer than tube, longer than corolla ; corolla yellowish, velvety, tube long ; capsule long-beaked — June — Hills south of Qaryetein.

13. EUFRAGIA, Griseb. Eufragia.

Calyx tubular, 4-cleft. Corolla tubular, cylindrical, the upper lip hooded, not plaited, the palate convex, and the lower lip spreading, 3-lobed. Stamens didynamous, the cells of the anthers mucronate. Capsule oblong or lanceolate, somewhat compressed. Seeds numerous, minute, not grooved — Annual, viscid herbs.

1. E. latifolia, L. ⊙ .1 to .3. Leaves .01 long, nearly sessile, the lowest crenate, *the upper nearly palmatilobed.* Spike ovate, at length elongated, and interrupted below ; calyx-teeth oblong, shorter than tube ; corolla .01 long, *purple to whitish*, lower lip about as long as upper ; anthers *glabrous* — Spring — Fields and roadsides ; common.

2. E. viscosa, L. ⊙ .3 to .5. Leaves .02 to .03 long, *oblong, crenate-dentate.* Spikes long, loose ; calyx-lobes linear, scarcely shorter than tube ; corolla .015 long, *yellow*, lower lip longer than upper ; anthers *hairy* — Spring — Fields along coast ; lower zone of Lebanon ; Gilead.

14. TRIXAGO, Stev. Trixago.

Calyx dilated-campanulate, short-4-cleft. Corolla cylindrical with bigibbous palate, and galeate upper lip, without plaited margins ; lower lip 3-lobed. Stamens didynamous, with mucronate anther-cells. Capsule ovate, turgid, with thickened, bifid placentas. Seeds minute, very numerous, longitudinally nerved — Annual herbs, drying-black.

T. Apula, Stev. .3 to .6, glandular-hairy above. Leaves sessile or clasping, oblong-lanceolate to linear, .03 to .06 long, obtusely serrate-dentate. Spike dense, ovate, .02 to .04 long, at length oblong ; calyx-teeth ovate, one-fourth to one-fifth as long as tube ; corolla .02 long, purple or variegated, lower lip longer than upper ; anthers hairy ; capsule ovate-globular — Spring — Common throughout.

Var. **flaviflora,** Boiss. Corolla yellow — With type.

15. ODONTITES, Haller. Odontites.

Calyx 4-cleft, tubular or campanulate. Upper lip of corolla entire or retuse, not plaited ; lower lip trifid, with entire lobes ; palate not

plaited. Stamens didynamous, inserted under upper lip, anthers mucronate or muticous. Capsule oblong, flattened. Seeds many, pendulous, longitudinally grooved — Annual or shrubby-perennial herbs, with linear, or linear-lanceolate, opposite leaves, .01 to to .03 long.

* *Anthers glabrous.*

1. O. Aucheri, Boiss. ⊙ .1 to .15, appressed scabrous-canescent and tubercled, more or less viscid with sessile glands ; stems slender, sparingly branched. Leaves *narrowly linear*, convolute. Calyx-teeth *lanceolate, as long as* tube ; corolla *red ;* anthers *included, muticous*, capsule retuse, apiculate — Summer — Alpine and subalpine Lebanon, Antilebanon, Amanus, and northward.

2. O. lutea, L. ⊙ .3 to .5, crisp-puberulent ; stems stiff, much- and long-branched. Leaves *lanceolate-linear* to linear, entire or sparingly dentate, often deflexed, *flat.* Calyx-teeth triangular, *half* as long as tube ; corolla *yellow ;* anthers *exserted, mucronate ;* capsule obtuse -- July to September — Dry hills ; foot of Amanus, to Akher-dagh, and northward.

Var. **hispidula,** Boiss. Bracts and calyx long-hispid — Lebanon.

* * *Anthers bearded or woolly.*

3. O. glutinosa, M.B. ⊙ .1, minutely glutinous-pubescent ; stem stiff, simple, or with few branches shorter than terminal spike. Leaves linear, convolute. Calyx-teeth somewhat longer than tube ; corolla *yellow, with long, exserted tube ;* lower lip longer than upper ; anthers included, mucronate ; capsule truncate, apiculate — August and September — Ziaretdagh in Amanus, and northward.

16. RHYNCHOCORYS, Griseb. RHYNCHOCORYS.

Calyx laterally compressed, bilabiate, the upper lip bidentate or retuse, the lower bifid. Corolla tube short, cuneate-campanulate, the galea tapering into a long proboscis-like beak with conduplicate margins, forming a sheath to the style, the lower lip spreading, 3-lobed. Stamens didynamous, with short filaments, anthers oblique, glabrous, with equal, muticous cells. Capsule globular, more or less flattened, the valves coherent by means of the partition. Seeds definite in number, striate or ribbed — Annual or perennial herbs, with opposite leaves.

R. Boissieri, Post. (Plant. Postian. Fasc. V. p. 14). ⊙ .3 to .5, crisp-pappillose, turning black in drying ; stems weak, simple or sparingly branched. Leaves very short-petioled, elliptical, cordate or truncate at base, crenate-dentate. Flowers axillary, solitary, forming a long, leafy, one-sided raceme ; upper lip of calyx broader and once and a half to twice as long as lower, scarcely notched at tip, lower lip bilobed ; corolla yellow, the galea gibbous above, ending in an awl-shaped toothless beak, .006 to .008 long, furnished on each side at base with a triangular, recurved lobule, and expanded at tip into a minute lamina, lower lip broader than long, obtusely 3-lobed ; capsule glabrous ; seeds 15-20, minutely tubercled — July — Middle zone of Amanus.

17. RHINANTHUS, L. Yellow-Rattle.

Calyx inflated, flattened, 4-toothed. Corolla-tube cylindrical, galea ovate, obtuse, compressed, somewhat 2-toothed near tip, lower lip shorter, spreading, 3-lobed. Stamens didynamous, anthers transverse, hairy, obtusely bilobed, muticous. Capsule compressed, orbicular, valves membranous, bearing septa, placentæ thin. Seeds few, large, nearly orbicular, flattened, winged — Annual herbs.

R. major, Ehrh. ⊙ .3 or more, glabrous or hirsute. Leaves sessile, oblong-lanceolate, crenate-dentate. Spikes ovate, dense, at length elongated, loose ; bracts pale, cut into triangular, mucronate teeth ; corolla yellow, .02 long, tube somewhat curved, teeth of galea ovate — Spring -- Plain of el-Ḥûleh (Tristram).

Order LXXIII. OROBANCHACEÆ. Lindl.
(Broom-Rape Family).

Herbs destitute of green foliage, (root parasites) monopetalous, didynamous, with parietal placentæ, in pairs or separate. Pod with many, minute seeds, with albumen and a very minute embryo — Calyx persistent, 4-5-toothed or lobed. Corolla tubular, more or less 2-lipped, oblique, marcescent. Stamens inserted on the tube of the corolla; anthers 2-celled, persistent. Ovary free; style long, curved at apex; stigma large. Pod 1-celled, 2-valved. Thick, fleshy herbs, bearing scales in place of leaves, lurid, yellowish, or brownish throughout, generally perennial.

** Corolla lobes all spreading.*

1. ANOPLANTHUS. **Flowers large, crimson, bractless.**

2. PHELIPÆA. **Flowers yellow, blue, or purple, bracted.**

** * Posterior lip of corolla erect or nearly so.*

3. OROBANCHE. **Flowers yellow, blue, or purple, bracted.**

** * * Corolla bilabiate, lips erect.*

4. LATHRŒA. **Flowers pinkish-white, bracted.**

1. ANOPLANTHUS, Endl. Anoplanthus.

Flowers perfect, bractless. Calyx campanulate, 5-cleft. Corolla short-campanulate, with spreading, nearly 2-lipped, and nearly equally 5-lobed limb. Stamens 4, didynamous, inserted on the corolla-tube, anther-cells separate at base, mucronate. Ovary 1-celled ; stigma capitate somewhat 2-lobed. Capsule 2-valved, the valves with converging placentas on either side within the margin ; seeds many, reticulate — Parasitic herbs, with large, scarlet flowers.

A. coccineus, Marsch. ♃ .2 to .25, glabrous or minutely glandular above. Scales ovate-oblong, half-clasping, sheathing, remote. Scape with 1-2 flowers, .03 to .05 broad ; calyx-lobes oblong-triangular, corolla-lobes round-ovate — May — Mountains to alpine regions ; Cassius to Akherdagh, and northward, and eastward.

2. PHELIPÆA, Tourn. PHELIPÆA.

Flowers perfect, with median bract at base, and two lateral bracteoles. Calyx 4-5-fid. Corolla bilabiate, upper lip bifid, lower trifid. Stamens 4, didynamous, inserted on corolla-tube ; anther-cells mucronate at base, with muticous or mucronate connective. Ovary 1-celled, with 4, twin, parietal placentæ. Capsule 2-valved, dehiscent at apex. Seeds numerous, reticulate — Herbs with aspect of Orobanche.

* *Calyx-lobes unequal, acuminate, anthers glabrous, or more or less villous. Capsule crowned with base of deciduous style.*

† *Stem always simple.*

1. P. cærulea, Vill. ♃ Stem tall. Spike rather loose, pubescent-glandular ; bract ovate-lanceolate, shorter than calyx ; bracteoles subulate ; calyx-lobes 5-4, lanceolate, acuminate ; corolla twice and a half as long as calyx, glandular-pubescent, *amethystine*, tubular, curved forward, the middle of the tube narrowed, the lobes of the lips *acute, flat;* anthers glabrous, or sparingly bearded at apex ; stigma white, biglobose — June — Lebanon ; Carmel.

2. P. Libanotica, Schweinfürth. (Boiss. Suppl. Fl. Or. 357). Spike dense, pyramidal, acute, longer than stem ; bract subulate from a broader base, longer than the buds of the upper part of the spike ; bracteoles short, linear-lanceolate ; calyx-lobes 4-5, lanceolate, subulate-tapering ; corolla twice and a half as long as calyx, pale greyish-violet, papillose-hirsute, tubular-campanulate, nearly straight, lobes ciliate, short-ovate, obtuse, *abruptly-cuspidate ;* anthers woolly — Summer — On the pass between the Cedars and 'Ain-Ata (Lebanon).

† † *Stem often branching.*

3. P. lavandulacea, R'chb. ♃ .1 to .3, short-papillose ; stem simple or sparingly branched below. Spike long, rather dense, many-flowered ; bract ovate-lanceolate, acuminate, *a little shorter* than calyx ; bracteoles linear-subulate ; calyx leathery, with subulate-tapering lobes ; corolla .02 to .03 long, thrice as long as calyx, blue, gradually widening from base, puberulent, curved forward, with *round-ovate, denticulate-ciliate-lobes ;* beard of anthers unequal ; stigma subquadrate — March to June — Shittim Plain, and Jericho to northern Palestine, Lebanon, Antilebanon, Damascus, Cassius, and northward.

4. P. pyramidalis, Rent. ♃ .1 to .3, short-papillose ; stem simple, rarely branching at base of compact spike. Bract lanceolate, acuminate, *much shorter* than calyx ; bracteoles linear-subulate ; calyx membranous, with subulate-tapering lobes ; corolla .02 to .03 long, twice and a half as long as calyx, blue, gradually widening from base, with ovate-lobes ; anther-connective long-woolly ; style retuse —June — Suf Dagh. *Too near the last.*

5. P. ramosa, L. ♃ .1 to .3, glandular-pubescent, yellow ; stems simple or branched ; spikes rather loose. Bract oblong-lanceolate, acuminate, bracteoles linear-subulate, a little shorter than calyx ; calyx-lobes as long as tube, subulate from a triangular base ; corolla .01 to .015 long, *yellow or violet*, twice and a half as long as calyx, *constricted above ovary*, curved near apex, with ovate, obtuse lobes ; filaments puberulent at base ; anthers glabrous, or sparingly woolly at sutures ; stigma retuse — September — Common throughout.

Var. **Muteli,** Boiss. Spikes shorter, denser. Corolla larger, more violet, more constricted above ovary, and rather more dilated at tip — Arabia Petræa ; Syria ; Palmyrene Desert.

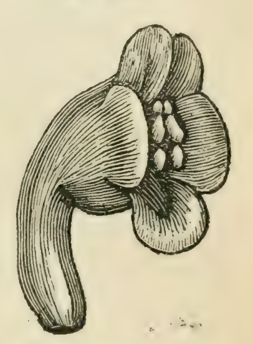
Var. **nana,** Boiss. Stem simple, short ; spike dense, few-flowered — Coast.

6. P. Ægyptiaca, Pers. ♃ .2 to .3 or more, glandular-papillose ; stems simple or branched ; spikes long, loose. Bract oblong ; bracteoles narrow-lanceolate, rather shorter than calyx ; calyx-lobes acuminate from a triangular base ; corolla .02 to .03 long, thrice as long as calyx, blue, tubular-funnel-shaped, curved, with ovate, obtuse lobes ; anthers woolly at sutures ; stigma retuse — Spring and summer — Palestine ; northern Syria.

* * *Calyx-lobes equal. Anthers woolly. Capsule crowned with persistent style. Stem always simple, fleshy.*

7. P. lutea, Desf. ♃ *Halûq. Danûn. Barnûq. Terathîth. Turfâs.* .3 to .6, glabrous; stems .01 to .015 thick, beset with oblong-lanceolate, .03 long scales. Spike .01 to .04 long, dense ; bract *ovate,* .01 long, obtuse, as long as calyx or longer ; bracteoles *oblong,* shorter than calyx ; lobes of *campanulate* calyx *ovate,* obtuse, scarious-margined ; corolla *lemon-yellow,* .04 long, twice and a half as long as calyx, narrow at base, .015 broad at tip, with ovate-orbicular, spreading lobes ; connective of anther *apiculate ;* pods ovoid, .015 long — Spring — Valleys around Dead Sea ; el-Ghor ; wilderness of Judea ; et-Tîh ; Syrian Desert ; on Chenopodiaceæ.

FIG. 268.



Flower of P. lutea.

8. P. tubulosa, Schenk. ♃ *Therthûr,* .6 to 1, glabrous ; stem .01 to .015 thick, beset with lanceolate scales. Spike long, dense ; bract *broad-lanceolate,* longer than calyx ; bracteoles *linear-lanceolate,* shorter than calyx ; lobes of *tubular* calyx *oblong,* obtuse ; corolla *purple,* .04 long, twice as long as calyx, narrow at base, .014 broad at apex, with rounded lobes ; connective of anther *not apiculate* — Spring — On Tamarisks ; Sinai ; er-Ramleh (et-Tîh) ; around Dead Sea.

9. P. salsa, C. A. M. ♃ .3, *woolly ;* stem thick, beset with *ovate-oblong, obtuse* scales. Spike long, dense ; bract ciliate-margined, ovate-lanceolate, somewhat longer than calyx ; bracteoles linear-oblong, as long as calyx ; calyx glabrous, *campanulate,* with ovate, obtuse lobes, often tomentellous at margin ; corolla *violet,* .025 long, nearly straight, about thrice as long as calyx, tubular-campanulate, with spreading, semi-orbicular lobes ; connective of anthers short-apiculate — Spring — Clayey, salt marshes ; Eastern Moab ; Syrian Desert ; on Chenopodiaceæ. *P. incana, Paine,* belongs to this species.

3. OROBANCHE, L. Broom-Rape.

Flowers hermaphrodite, with 1 bract and 2 bracteoles. Calyx usually of 2, entire or bifid sepals, sometimes gamosepalous. Corolla

ringent. Cells of anthers mucronate at base. Ovary 1-celled, with 4 parietal placentæ in pairs. Stigma retuse or bilobed. Capsule laterally dehiscent, valves adherent at base and apex. Seeds reticulate.

* *Filaments inserted on lower fourth of corolla-tube.*

† *Stigma yellow.*

1. O. Anatolica, Boiss. et Reut. ♃ .2 to .4, scape, scales, bracts, and calyx more or less *cobwebby;* stem thick, beset with ovate, acute, imbricated scales; spike dense, oblong-cylindrical. Bracts oblong-lanceolate, about as long as corolla; sepals many-nerved, ovate, bilobed, half as long as corolla, coalesced in fruit; corolla leathery, short-campanulate, little curved, deep purple, glandular, upper lip galeate, lower with short, obtuse lobes; filaments inserted at base of corolla, hairy, rarely glabrous below — May to July — Amanus, and northward.

Var. **glabrescens,** Post. Glabrescent — Marash.

2. O. Palæstina, Reut. ♃ .3 to .4, sparingly papillose; spike long, loose. Bract oblong below, linear-subulate above, *longer than corolla;* sepals few-nerved, oblong, entire or bifid, with linear-subulate lobes, longer than corolla-tube; corolla *whitish,* tubular, slightly curved, with small, nearly equal lips, the upper *subulate,* the middle lobe of the lower rather longer; filaments inserted a quarter the way up the corolla-tube, hairy at base — Spring — Shechem and Banias to Marash.

† † *Stigma violet, purple, or white.*

3. O. speciosa, DC. ⊙ *Khaniq-ul-Kirsennah.* .15 to .5, crisp-glandular-hairy, often quite tall, spike long, loose below. Bract lanceolate, subulate-acuminate, *a little longer than corolla-tube;* sepals 5-nerved, *as long as corolla-tube, bifid.* Corolla bell-shaped, *white striped with light purple,* papery and brownish when dry, filaments inserted near base of corolla, pubescent at base. *Stigma lurid* — January to April — On *Vicia, Ervum, Faba,* and many other plants. The commonest species of the genus.

4. O. pubescens, Urv. ♃ .3 to .4, *crisp white-woolly;* spikes long, rather dense. Flowers small; bract ovate-lanceolate, acuminate, as long as corolla; sepals 2-∞-nerved, entire or bifid, longer than corolla-tube; corolla somewhat woolly, *yellowish-red,* or *lilac,* short tubular-campanulate, straightish or curved, with irregularly denticulate lips, the upper nearly entire, the lower with rounded lobes; filaments inserted near base of corolla-tube, woolly below — Spring — Northern Palestine to Mesopotamia.

5. O. cernua, Löfl. ♃ .15 to .3, minutely pruinose or glabrescent; stem thickish, scaly below. Spike dense, violet; bract ∞-nerved, ovate-lanceolate, acute, half as long as corolla; sepals ∞-nerved, ovate, entire or bifid, half as long as corolla; corolla .015 long, glabrous, tubular, *curved at middle, nodding,* violet, lips small, crenate, not ciliate, the upper bilobed, the lower nearly equal-lobed; filaments inserted above middle of tube — Spring — Palestine; Gilead; Ḥaurân; Leja; Ghor-eṣ-Ṣafieh, and southward in the Tîh.

4. LATHRŒA, L. Lathrœa.

Flowers perfect, bracted but not bracteoled. Calyx campanulate, 4-fid. Corolla 2-lipped. Stamens inserted on corolla-tube, base of

anther-cells separate and mucronate. Ovary with a free gland at base; style thick, stigma capitate. Capsule 1-celled, 2-valved, valves bearing four twin placentæ near axis. Seeds numerous or few — Parasitic herbs, with the subterranean part of the stem resembling a root-stock.

L. Squamaria, L. ♃ .15 to .3 ; scales of root-stock fleshy, imbricated ; stem with few scales, erect, simple. Bracts ovate or obtusely rhombic ; flowers pedicelled, somewhat pendulous ; calyx campanulate, cleft to middle into 4, triangular-ovate, obtuse lobes ; corolla whitish-pink, once and a half as long as calyx, the upper lip somewhat hooded, entire, the lower shorter, 3-toothed ; anthers villous — May — On trees and shrubs in woods ; Amanus, and northward.

ORDER LXXIV. **LENTIBULARIEÆ.** Rich.
(BLADDERWORT FAMILY).

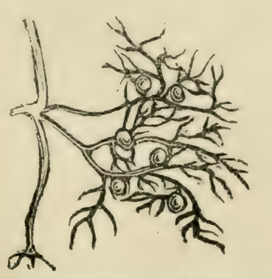
Aquatic herbs with a two-lipped calyx, and two-lipped, personate, spurred corolla, 2 *stamens with confluently one-celled anthers, and a free,* 1-*celled ovary, with a free, central placenta, bearing numerous orthotropous seeds, with a straight embryo and no albumen.* Palate of corolla usually bearded; style short or none; stigma 1-2-lipped, the lower lip larger, with a prominent palate— Marsh or aquatic herbs.

1. **UTRICULARIA**, L. BLADDERWORT.

Upper lip of calyx entire, lower often retuse or bidentate. Upper lip of corolla erect, entire or retuse, lower longer, often trilobed. Filaments of stamens dilated, anthers dehiscent lengthwise. Style (in ours) 0. Capsule at length irregularly torn. Seeds polyhedrous — Floating, perennial herbs, (ours) with leaves all dissected into capillary lobes, bearing little bladders.

U. vulgaris, L. ♃ Roots none or few, not fixed. Leaves spreading on every side. Scape several-flowered, loose ; pedicels longer than bract and calyx ; corolla yellow, upper lip about as long as inflated, orange-striped palate, spur oblong-conical, descending ; anthers connate — Summer — Stagnant waters above the Huleh.

FIG. 269.



Branch of the root of U. vulgaris, showing the bladders and fibres.

FIG. 270.



Segment of branch of U. vulgaris, with personate flower.

ORDER LXXV. **PEDALINEÆ.** Endl. (SESAMEÆ DC.) (SESAMUM FAMILY).

Herbs (ours) annual, transuding a mucilaginous moisture from all parts of the surface, with a 5-parted, slightly 2-lipped calyx, irregular, hypogynous, 5-lobed, usually 2-lipped corolla, with inflated throat, a hypogynous, glandular, fleshy disk, five stamens inserted on the corolla tube, the upper sterile, the rest didynamous, fertile, a 2-4 (rarely 8-) celled ovary, with a simple style — Anthers 2-celled, the connective produced beyond the cells; stigma lobed; fruit (in ours) a dehiscent capsule, normally 5- but by abortion 2-4-celled; seeds in one row along the margins of the cells or inserted on a central column, adnate to the valves, exalbuminous.

1. **SESAMUM,** L. SESAME. *Simsum.*

Calyx persistent, the lower lobe shorter. Corolla-tube gradually expanding, with bilabiate limb, the upper two lobes shorter than the lower three. Stigma bilamellate. Capsule prismatic-tetragonal, four-grooved, two-celled above, four-celled below by incurving of the valves, dehiscent by a septicidal split at tip. Seeds numerous, wingless, implanted on central column.

S. Indicum, L. ⊙ Sesame. *Simsum.* .6 to 1, stem erect, pubescent, simple or few branched. Lower leaves opposite, ovate, trisect or trilobed, lobes entire or dentate ; upper leaves alternate, oblong to linear-lanceolate, short-petioled, entire. Flowers solitary in axils, short-pedicelled ; capsule .02 to .03 long, .005 broad, mucronate with base of style, velvety-pubescent — July and August — Cultivated everywhere for its oleaginous seeds, and escaped from cultivation.

ORDER LXXVI. **ACANTHACEÆ.** Juss. (ACANTHUS FAMILY).

Herbs or shrubs or trees (ours perennial herbs), with perfect, generally irregular flowers, a persistent calyx with 5, or by abortion 4, free, or more or less connate sepals, corolla gamopetalous (ours) with limb split above and expanded into a single, obovate lip below, (ours) 4 didynamous stamens, a free, 2-celled ovary (ours) with 2-4 seeds borne on a thickened, hardened, incurved, ascending funicle (retinaculum), exalbuminous — Capsule globular, oblong or linear, dehiscent at base of cells, often elastically, placentæ borne on lower half of valves, embryo straight, flattened, radicle inferior.

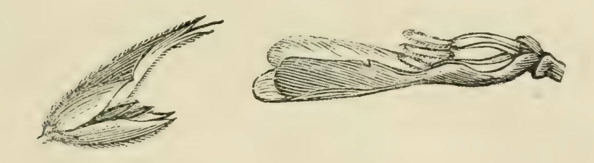
1. **BLEPHARIS,** Juss. BLEPHARIS. *Shauk-ed-Dibb.*

Calyx 4-parted, the upper and lower sepals exterior, larger, the lateral interior, small. Corolla-tube short, ovoid, constricted at apex,

limb short, cup-shaped at base, 3-5-lobed at apex. Stamens shorter than lip, inserted at its base, filaments thickened, incurved, the posterior produced to a point beyond the insertion of the anther ; anthers connivent in pairs, ciliate, 1-celled. Style bifid at tip. Capsule 4- or by abortion 2-seeded — Perennial herbs with aspect of Morina.

B. edulis, Forsk. ♃ *Shauk-ed-Dibb.* .3 to .4, minutely roughened and ciliated, glaucous, the neck bearing 1-several, 1-3-branched, thickened stems. Root-leaves soon disappearing, entire, with spiny margins, those of branches at base of spikes oblong to lanceolate, spiny-dentate. Spikes at length elongated, 4-ranked, the terminal sessile, the lateral short-peduncled ; bract indurated, lanceolate, prominently nerved and grooved, spreading, with 3-5 lateral spines on each side, and a long-spiny tip, longer than flowers ; bracteoles shorter, linear-subulate, villous ; outer calyx-lobes oblong, the upper longer, 3-dentate, the lower 2-dentate, the lateral one-fourth their length, oblong ; corolla bluish, 3-lobed, with a small tooth on each side; capsule flattened-ovate, tapering, .01 long — Spring — Valleys about Dead Sea, and southward to Sinai and Egypt.

Fig. 271. Fig. 272.



Calyx of B. edulis. Corolla and stamens of B. edulis.

2. ACANTHUS, L. Acanthus. *Shauk-el-Jamal.*

Calyx 4-parted, the upper and lower sepals exterior, broad, elongated, veined, the lateral interior, small, obovate or orbicular. Corolla-tube annular, short, cartilaginous, limb tapering at base, split above, expanded into a broad, obovate, flat, 3-lobed limb. Stamens inserted at throat, filaments thick, rigid, somewhat incurved at tip ; anthers 1-celled, bearded lengthwise. Style short-bifid. Capsule 2-celled, oblong, coriaceous, glossy, 4-seeded from base to middle — Perennial herbs, with aspect of Morina, the flowers in a dense, thick, spiny-bracted spike.

A. Syriacus, Boiss. ♃ *Mar 'awîla. Hiş. Shauk-el-Jamal.* .5 to 1, puberulent ; stem little produced beyond leaves. Root-leaves large, oblong-lanceolate, tapering at base to a short petiole, pinnatisect or -parted into lanceolate, spiny-margined or -lobulated lobes confluent at base ; stem-leaves usually one pair, sessile. Spike ovate-cylindrical, compact ; bract broad, coriaceous, prominently nerved and reticulate, ovate-oblong, ciliate at margin, glabrescent at back, with 4-6 spines at each edge and a tapering spiny tip about as long as flower ; bracteoles shorter, narrow-linear, hirtulous, spinulose at apex ; outer sepals herbaceous, the upper oblong-spathulate, longer than corolla, minutely repand-toothed at tip, the lower narrower and shorter, linear, dilat-

ed at tip, bifid, spiny-toothed ; corolla whitish, glabrous, lobes rounded ; capsule .025 long — May and June — Common to middle mountain zone.

Var. **dentatus,** Boiss. Leaves shorter, irregularly spiny-dentate — Aintâb.

ORDER LXXVII. GLOBULARIEÆ. (GLOBULARIA FAMILY).

Herbs or shrubs with perfect, irregular flowers, in globular, involucrate heads, with oblique, usually bilabiate corolla, 4, *didynamous stamens inserted on the corolla-tube, confluent,* 1-*celled anthers, bifid stigma, a* 1-*celled, free ovary, with* 1, *pendulous, anatropous ovule ; fruit an indehiscent utricle, with terete embryo in the axis of the albumen ; radicle superior* — Calyx 5-cleft or -parted, equal or bilabiate, persistent. Corolla sometimes obliquely 1-lipped.

1. GLOBULARIA, L. GLOBULARIA.

Calyx turbinate or campanulate at base. Corolla with short tube, upper lip bipartite or 0, lower 3-parted or -dentate. Stamens inserted at throat ; anthers versatile. Style bidentate at apex. Fruit included in calyx, oblong — Genus distinguished by its globular heads of blue flowers.

* *Herbaceous perennials with stoloniferous root-stock, and* 1-*headed scapes.*

1. G. trichosantha, F. et M. ♃ .2 to .35, glabrous, drying black. Root-leaves *rosetted,* obovate to spathulate, obtuse or tridenticulate at apex ; cauline sessile, mucronate, lenticular to oblong, acute. Head .014 to .02 broad in flower, .02 in fruit ; involucre leaves long-acuminate ; calyx-lobes lanceolate-subulate, 3-4-times as long as tube ; lobes of upper lip of corolla *capillary,* of lower *narrowly linear* — June — Shady places ; Nusairy Mountains and Amanus, to Aintâb, and northward.

FIG. 273.

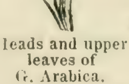


Head and upper leaves of G. trichosantha.

* * *Shrubby, glabrous, branching plants.*

2. G. Alypum, L. ♄ .3 to .6, glaucescent ; branches elongated. Leaves scattered, leathery, .01 to .02 long, *oblanceolate-cuneate,* acute, mucronate or tridentate at apex. Heads terminal, .01 broad in flower ; involucre leaves ovate, imbricated ; receptacle *nearly globular, stipitate ;* calyx-lobes twice as long as tube, linear-acuminate ; corolla twice as long as calyx, with *rudimentary, bidentate upper lip,* and *rather long,* short-tridentate, lower lip — Winter and spring — Jebel Abu-Qusheibah (El-'Arabah) ; Lebanon, and northward.

Fig. 274.

Heads and upper leaves of G. Arabica.

Fig. 275.



Heads of G. Orientalis.

3. G. Arabica, Jaub. et Sp. ♄ .3 to .5, glaucescent, branches *short.* Leaves scattered, *oblong-spathulate,* entire or somewhat 3-toothed at apex. Heads terminal ; involucre leaves ovate, imbricated ; receptacle *conico-cylindrical, not stipitate ;* calyx-lobes thrice as long as tube, lanceolate-subulate ; corolla once and a half as long as calyx ; *upper lip* 0, *lower short-trilobed* — Spring — Sinai. Wrongly called by the Arabs Ḥandaqûq.

4. G. Orientalis, L. ♄ .2 to .4 or more ; stem woody, ascending or diffuse, tortuous; flowering stems brittle, sparingly leafy, *ending in a spike-like raceme,* quite loose at base. Radicle leaves fascicled, oblong to obovate-spathulate ; cauline sessile, oblong-lanceolate to linear, acuminate. Heads 5-20, small, .003 to .006 broad, remote, *on peduncles usually shorter than they, the upper sessile, crowded ;* involucre leaves ovate, short-acuminate; calyx *short-bilabiate,* with short-triangular teeth ; corolla about thrice as long as calyx, *with nearly equal lips,* about twice as long as tube, the upper bipartite, the lower trifid — July — Clayey soil ; Aintâb, and northward.

Order LXXVIII. VERBENACEÆ. (Vervain Family).

Herbs or shrubs, with opposite leaves, a more or less 2-lipped or irregular corolla, didynamous stamens, a 2-4-*celled, free ovary, ripening into a dry drupe consisting of* 2-4, *one-seeded pyrenes* — Flowers perfect, or polygamous-diœcious. Calyx persistent, 4-5-toothed or parted. Embryo straight with inferior radicle. Albumen 0 or very little.

* *Inflorescence spiked or racemed, centripetal.*

1. LIPPIA, L. Lippia.

Calyx small, tubular, membranous, 2-4-toothed. Corolla funnel-shaped with cylindrical tube, and oblique, somewhat bilabiate limb, the upper lip entire or 2-lobed, the lower 3-cleft. Stamens inserted on middle of tube, generally included ; anther cells parallel. Ovary with two, 1-seeded cells, a short style, and oblique or recurved stigma. Fruit small, dry, included, separating into 2 pyrenes — (Ours) herbs with opposite leaves, and capitate flowers.

L. nodiflora, L. ♃ Procumbent, green or canescent, rooting at nodes, clothed with appressed hairs fixed by their centre. Leaves cuneate-spathulate, .01 to .03 long, tapering to a short petiole, entire below, acutely serrate above. Peduncles axillary, solitary, longer than leaves ; head ovate, at length oblong-cylindrical, .01 or more long ; corolla pinkish; fruit ovate, broader than long — All the year — Sands and moist fields, along and near coast ; Jordan Valley.

2. VERBENA, L. Vervain.

Calyx tubular, 5-ribbed, 5-toothed, not changing in fruit. Corolla funnel-shaped with straight or incurved tube, spreading, somewhat 2-lipped, unequally 5-lobed limb. Stamens included ; anthers ovate, with nearly parallel cells, and connective not spurred. Ovary with four, 1-seeded cells, and short-bifid style. Fruit included, separating into 4 pyrenes — Herbs with minute, spiked flowers.

1. V. officinalis, L. ♃ .3 to 1, paniculate above, scabridulous at angles. Leaves oblong to oblong-lanceolate, coarsely *dentate, incised, lobed, or lyrate-pinnatifid,* contracted into a short petiole. Spikes .05 to .2 long, slender ; corolla lilac, with tube exserted — May to September — Roadsides and waste places ; common.

2. V. supina, L. ⊙ .2 to .4, hispidulous, canescent, branching from base, ascending or decumbent. Leaves petioled, *the lowest oblong, incised, soon withering,* the rest ovate, *bipinnatisect into ovate-oblong, entire or dentate lobules.* Spikes alar and terminal, solitary, at first dense, then elongated to .05 long ; corolla blue, with slightly exserted tube — Summer — Sandy and clayey inundated places ; Leja ; central and northern Palestine ; middle Lebanon ; Antioch.

Var. **minor.** Leaves less dissected. Spikes short, .02 to .05 long — Inundated field, Akherdagh ; 2000 m.

* * *Inflorescence centrifugal, of 2-3-chotomous axillary cymes, arranged in interrupted, panicled spikes.*

3. VITEX, L. Vitex.

Calyx short-campanulate, 5-toothed. Corolla-tube short, with oblique, 5-cleft, somewhat bilabiate limb, the anterior lip longer. Stamens distant, exserted, with distinct, somewhat divergent anther-cells. Ovary with four, 1-seeded cells, and short, bifid style. Drupe dry — Shrubs, with opposite, digitate leaves.

V. Agnus Castus, L. ♄ *El-Ghâr. Hashîshat-Abu-Shîh.* 1 to 2 or more ; branches obtusely quadrangular, woolly, ending in a broad panicle. Leaves long-petioled, digitately 5-7-parted into lanceolate, acuminate, nearly entire leaflets, with tapering base and short petioles. Cymes compact, nearly sessile, forming somewhat remote, long-spiked whorls. ; bracts minute or 0 ; calyx-teeth broad-triangular, obtuse, one-third as long as tube ; corolla lilac, thrice as long as calyx, tube exserted ; drupe spherical, .002 in diameter, a little longer than calyx — June to September — Banks of streams ; common between - 400 and + 400 m. A decoction of it used for colic ; also as a yellow dye.

* * * *Cymes small, capitate, nearly ternate at upper axils, and terminal, short-peduncled.*

4. AVICENNIA, L. Avicennia.

Calyx short, 5-parted into ovate, imbricated lobes. Corolla tube short, cylindrical, straight, limb spreading, nearly equally 4-cleft. Filaments 4, short, anthers somewhat exserted, cells parallel. Ovary imperfectly 4-celled by means of a central, 4-winged column, cells 1-ovuled, style short, bifid. Capsule large, somewhat fleshy, dehiscent

by two, thickish valves. Seed by abortion 1, embryo large, destitute of testa, germinating within its pericarp, cotyledons large, folded lengthwise, radicle inferior, the plumule enlarged before the fruit falls — Perennial trees, with opposite, leathery leaves.

A. officinalis, L. ♄ ♄ *Shaurah.* Leaves oblong to elliptical or obovate, entire, tapering into a short petiole, green at upper surface, snowy white at lower. Cymes capitate, dense, three or less together at the upper axils and tips of branches, short-peduncled ; flowers sessile, each with a bract, and two, ovate bracteoles, which are silky at outer face and shorter than calyx ; corolla-lobes half-exserted, ovate, ascending, glabrous at upper surface silky at lower ; stigmas nearly sessile — Arabia Petræa to Egyptian Desert.

ORDER LXXIX. LABIATÆ. (MINT FAMILY.)

Herbs or shrubs, with 4-angled stems, opposite or whorled, aromatic leaves, more or less 2-lipped, perfect flowers, didynamous or diandrous stamens, a deeply 4-lobed ovary, forming in fruit 4, seedlike, 1-seeded nutlets surrounding the base of the single 2-lobed style, at the bottom of the persistent calyx — Anthers 2-1-celled; filaments inserted on corolla-tube. Nutlets smooth or slightly roughish, inserted by base (except in Ajuga and Teucrium). Albumen almost 0. Embryo straight (except in Scutellaria). Flowers axillary, chiefly in cymose clusters, these often aggregated in terminal heads, spikes, or racemes. Foliage usually dotted with glands containing a volatile, aromatic oil.

FIG. 276.

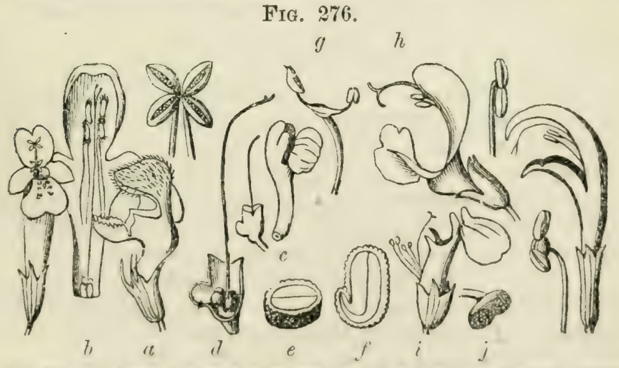


Fig. 276. (*a*) Lateral view of calyx and corolla of *Lamium amplexicaule*, showing the oblique calyx, hairy, hooded upper lip, and trilobed lower lip, of corolla. (*b*) Front view of the same, showing the didynamous stamens inserted on the tube. (*c*) Calyx and corolla of a species of *Scutellaria*. (*d*) Longitudinal section of calyx, showing the 4-lobed ovary and the style ascending from the middle. (*e*) Transverse section of one of its akenes. (*f*) Longitudinal section of the same. (*g*) Stamen of a *Salvia*, showing the cells of the anther, one fertile and the other sterile, at the ends of a connective astride the filament. (*h*) Bilabiate calyx and corolla of a *Salvia*. (*i*) Flower of a *Teucrium*, showing the campanulate calyx, and corolla with 5-lobed lower lip, and exserted longer pair of stamens. (*j*) Anthers of same.

TRIBE I. **LAVANDULEÆ.** Stamens 4, declined, included. Anthers confluent, 1-celled.

1. LAVANDULA. ♃ ♄ Pubescent or canescent plants with spiked inflorescence.

TRIBE II. **SATURIEÆ.** Stamens 4 or 2, equal or the anterior longer, distant, divergent or ascending. Anthers with 2, parallel or divergent cells. Calyx (in ours) 5-10-13 nerved.

** Corolla 4-toothed, scarcely if at all bilabiate.*

2. MENTHA. ♃ Flowers condensed into a terminal spike or head.
3. LYCOPUS. ♃ Flowers in globular, axillary, distant clusters.

** * Corolla bilabiate.*

4. ORIGANUM. ♄ ♃ Spikes ovate or oblong, with imbricated scales. Calyx 5-toothed.
5. THYMUS. ♄ ♃ Whorls interrupted or the terminal capitate. Calyx bilabiate.
6. SATUREIA. ☉ ♃ ♄ Whorls axillary or the terminal spiked. Calyx 5-toothed.
7. MICROMERIA. ♃ ♄ Cymes axillary, more or less distant. Calyx small, 5-toothed.
8. THYMBRA. ♄ Whorls crowded in a terminal spike. Calyx flattened, 2-edged.
9. CALAMINTHA. ♃ ☉ Whorls axillary, few-∞-flowered. Calyx tubular or slightly flattened at upper surface. Corolla-tube straight.
10. MELISSA. ♃ Cymes axillary, few-flowered. Calyx slightly flattened at upper surface. Corolla-tube recurved-ascending.

TRIBE III. **MONARDEÆ.** Perfect stamens 2, anterior.

** Cells of anther with a long connective.*

11. SALVIA. ☉ ♃ ♄ Connective astride the filament. Inflorescence whorled. (Fig. 276, *g*).
12. ROSMARINUS. ♄ Connective continuous with the filament. Filament with a small, reflexed tooth below middle. Inflorescence in axillary racemes.

** * Anther-cells with a short connective.*

13. ZIZYPHORA. ♃ ♄ ☉ Sterile filaments with 2, empty anther-cells or 0.

TRIBE IV. **NEPETEÆ.** Perfect stamens 4, under the upper lip, the posterior pair longer. Anther-cells divaricating. Calyx generally 15-nerved.

14. NEPETA. ☉ ♃ Upper lip of corolla flat.
15. LALLEMANTIA. ☉ ② Upper lip of corolla concave, with two folds within parallel with margin.

TRIBE V. **STACHYDEÆ.** Perfect stamens 4, under the upper lip, the anterior pair longer, or all enclosed in the tube. Calyx 5-10-nerved. Nutlets dry.

** Fruiting calyx closed by its incumbent lips.*

16. SCUTELLARIA. ♃ Calyx-lips entire, the upper furnished with a scale. (Fig. 276, *c*, *d*).
17. BRUNELLA. ♃ Upper calyx-lip 3-toothed, lower bifid.

** * Fruiting calyx open. Stamens and style included in corolla-tube.*

18. SIDERITIS. ♃ ☉ Calyx with 5, usually spiny teeth; the floral leaves in the annual species similar to the others, spreading or reflexed, in the perennial different, forming an involucre to the whorls.
19. MARRUBIUM. ♃ ☉ Calyx with 5-10, spinulous, mucronate or muticous teeth; the floral leaves conformed, spreading or reflexed.

** * * Fruiting calyx open. Stamens more or less exserted from tube.*

20. STACHYS. ♃ ☉ ♄ Calyx with equal or oblique, 5-toothed mouth. Nutlets rounded at tip.

21. WIEDEMANNIA. ⊙ Calyx with a 1-toothed upper and 4-toothed lower lip. Nutlets acutely triquetrous, truncate.

22. LAMIUM. ♃ ⊙ Calyx with equal or oblique, 5-toothed mouth. Nutlets acutely triquetrous, truncate. (Fig. 276, *a* and *b*).

23. MOLUCELLA. ⊙ Calyx reticulate, oblique or 2-lipped, growing much in fruit.

24. BALLOTA. ♃ ♄ Calyx-tube 10-nerved; mouth straight; teeth 5-10.

25. OTOSTEGIA. ♄ Calyx-tube 10-nerved, limb membranous, dilated, upper lip small.

26. LEUCAS. ⊙ ♄ Calyx-tube striate, mouth straight, teeth 10; upper lobe of style short.

27. PHLOMIS. ♃ ♄ Calyx-tube striate, mouth straight; teeth 5. Leaves undivided, never round, generally pannous.

28. EREMOSTACHYS. ♃ Calyx-tube fleecy or cottony, teeth 5, spiny. Leaves round or ovate, undivided, or bipinnatisect, not pannous.

TRIBE V. **PRASIEÆ.** As in last tribe, but the nutlets fleshy.

29. PRASIUM. ♄ Calyx campanulate, 10-nerved, irregularly 2-lipped.

TRIBE VI. **AJUGOIDEÆ.** Perfect stamens 4, ascending, with divaricate anther-cells. Corolla nearly 1-lipped, by obsolescence of the upper lip. Nutlets dry, pitted, or reticulate, in Ajuga Postii fleshy.

30. TEUCRIUM. ⊙ ♃ ♄ Corolla deciduous lower lip 5-lobed. (Fig. 276, *i* and *j*).

31. AJUGA. ⊙ ♃ ♄ Corolla marcescent, lower lip 3-fid, middle lobe often bifid.

1. LAVANDULA, TOURNEFORT. LAVENDER. *Lawanda.*

Calyx ovate-tubular, 13-15-nerved, teeth 5, short, the uppermost often with a dilated appendage, all connivent in fruit. Upper lip of corolla rather large, 2-lobed, the lower 3-lobed. Stamens included, declined; anthers ovate-reniform, with confluent cells, dehiscent by a common, semicircular slit. Style bilamellate. Disk with 4, fleshy scales in front of the nutlets — Perennial herbs or shrubs.

* *Leaves undivided. Upper calyx-tooth appendaged.*

1. L. Stœchas, L. *Sha'nîneh.* ♃ .3 to .5, woolly-canescent, with numerous, erect branches. Leaves linear-oblong, the longer .02 long, opposite, the shorter .01 long, clustered in the axils of the longer, all obtuse, revolute-margined. Spikes oblong, dense, .02 to .03 long, .01 broad; bracts purple, veined, densely imbricated, obtriangular with rounded angles and a short point, the upper much larger, obovate-spathulate, sterile, deep violet, forming a showy tuft at tip of spike; corolla deep violet — March to October — Rocks, especially sandstone; common to 1200 m.

* * *Leaves 1-2-pinnatisect. Upper calyx-tooth not appendaged.*

2. L. pubescens, Dec. ♃ .4 to .6 or more, pubescent, viscidulous; stems erect, opposite-branched. Leaves *bipinnatisect into short, oblong-linear, acute lobules.* Spikes solitary or panicled, linear, *dense,* .02 to .05 long; bracts puberulent, oblong, acuminate, *a little shorter than calyx;* corolla-tube twice as long as calyx — Spring — Around south end of Dead Sea, and southward to Sinai and Egypt.

FIG. 277.



Spike of Lavandula pubescens.

3. L. coronopifolia, Poir. ♃ *Dictaé. Natash. Zeiteh.* .5 to 1, puberulent to glabrescent, many-stemmed; stems long, stiff, opposite-branched, nearly naked above. Leaves pinnatisect into *linear, entire lobes.* Spikes solitary or panicled, stiff, .05 to .15 long, *loose;* bracts *much shorter than calyx,* short-lanceolate; corolla-tube longer than calyx to twice as long — Spring and early summer — About Dead Sea, and southward and westward in Deserts.

FIG. 278.



Spike of Lavandula coronopifolia.

2. MENTHA, L. MINT. *Na'ná'.*

Calyx campanulate, 5-toothed. Corolla funnel-shaped, with included tube, gradually expanding into a nearly equally, 4-cleft limb, the upper lobe a trifle longer. Stamens 4, equal, with glabrous filaments, and parallel anther-cells dehiscent by parallel slits — Perennial herbs, with whorled flowers, condensed into terminal heads or spikes, or remote.

* *Whorls capitate or spiked. Throat of calyx naked, teeth nearly equal.*

1. M. sylvestris, L. ♃ .5 to 1 or more, erect, paniculate above. Leaves .02 to .05 long, nearly sessile, ovate to oblong or lanceolate, more or less dentate, sometimes crisp-wavy, canescent or glabrescent. Whorls many flowered, forming *conical or cylindrical spikes,* .02 to .08 long, dense or interrupted below; bracts linear-setaceous; corolla lilac — Summer — Ditches and banks; common even to alpine regions.

Var. **stenostachya,** Boiss. Spikes slender, more interrupted at base. Leaves more woolly, often wavy-margined.

Var. **petiolata,** Boiss. Leaves petioled, white.

Var. **glabrata,** Boiss. Green, minutely puberulent. Spikes thickish — Hamath.

Var. **lavandulacea,** Boiss. Canescent; spikes as in var. stenostachya; leaves linear-lanceolate, flat, often entire.

FIG. 279. FIG. 280.



Fig. 279. Spike of Mentha sylvestris.

Fig. 280. Head of Mentha aquatica.

2. M. aquatica, L. ♃ 1 or more; stem retrorsely hirsute. Leaves petioled, ovate, .05 to .02 long, serrate, rounded or subcordate at base, glabrescent or pubescent. Whorls 2-3, terminal, remote, or crowded into a spherical head; bracts lanceolate; corolla pink — August to November — In water; Esdraelon; coast; lower zone of Lebanon; Marash and northward.

* * *Whorls remote. Throat of calyx closed by a hairy ring; limb nearly 2-lipped.*

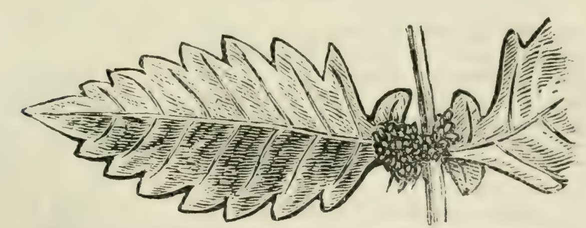
3. M. Pulegium, L. ♃ Pennyroyal. .2 to .5, villous, hairy, or glabrescent; stems prostrate, rooting at base. Leaves ovate or oblong, .005 to .03 long, short-petioled, obscurely denticulate. Whorls globular, .01 in diameter, constituting a long, interrupted, leafy spike; corolla pink — June to September — Wet places; middle zone of Lebanon; coast; Cœlesyria; Cassius; Amanus.

3. LYCOPUS, Tourn. Water-Horehound.

Calyx campanulate, equal, 4-5-toothed, with naked throat. Corolla campanulate, nearly equal, 4-cleft, scarcely longer than calyx. Stamens straight, divergent, the fertile two exserted, each with 2, parallel anther-cells, the sterile two included, filiform, or 0. Nutlets with callous margins, 3-angled, truncate at apex, tapering at base. — Perennial herbs, with globular, axillary whorls of white flowers.

L. Europæus, L. ♃ Gipsywort. .6 to 1, glabrous or puberulent; stem stiff, 4-angled and grooved, simple or opposite-branched. Leaves *oblong-rhombic*, .04 to .06 long, sinuate-dentate, tapering to a short petiole. Sterile filaments minute or 0 — June to September — Coast; lower Lebanon; Ghor-es-Safieh; Cœlesyria and Damascus to Hamath and northward.

Fig. 281.



Leaf and whorl of flowers from middle of stem of Lycopus Europæus.

4. ORIGANUM, L. Wild Marjoram. Origanum.

Calyx campanulate or turbinate, bilabiate, split down in front, or nearly equally 5-toothed. Corolla-tube included or exserted, the upper limb straight, retuse or bifid. Stamens 4; anthers with 2, distinct, divergent cells. Nutlets ovate or oblong — Shrubs or perennial herbs, with flowers subtended by more or less imbricated bracts, collected in more or less dense spikes or heads.

* *Bracts* .008 *to* .014 *long*, .006 *to* .008 *broad, pink or purple, longer than bilabiate calyx.*

1. O. Amanum, Post. (Plant. Postian. Fasc. VII. p. 12.) ♃ .15 to .2, crisp-papillose-hairy below, stems ascending, reddish, simple or sparingly branched above, leafy. Leaves sessile, prominently nerved, cordate-ovate, .01 to .015 long, *short-acuminate*, punctate, margin papillose-scabrous. Spikes .015 to .02 long, few-flowered, ovate, sessile; bracts more or less *reddish-purple*, ovate-oblong, *acuminate*, about twice as long as calyx; calyx glabrous, punctate, upper lip *acutely*

Fig. 282. Fig. 283.

tridentate to middle, *lower of equal length*, 2-toothed; corolla pubescent, tube *thrice* as long as calyx, not gibbous — August and September — Gaiour Dagh (Amanus) 1500 m.


Head of Origanum Amanum.

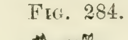

Spike of Origanum Libanoticum.

2. O. Libanoticum, Boiss. ♃ .3 to .6, hairy at base, glabrous above; rootstock shrubby, many-stemmed; stems ascending, leafy, panicled above. Leaves pale green, .015 long, ovate, obtuse, short-petioled, floral smaller, sessile. Spikes on long, slender, naked peduncles, somewhat nodding, *round-ovate, at length ovate,* .02 *long,* .015 *broad;* bracts *deep pink,* ovate, acute; upper lip of calyx split to middle into 3, *ovate, obtuse teeth, lower shorter, 2-toothed;* corolla pink, with tube *more than twice* as long as calyx — Summer — Middle and subalpine Lebanon.

* * *Bracts* .003 *to* .005 *long. Calyx nearly equally 5-toothed.*

† *Corolla-tube purple, twice to thrice as long as calyx.*

3. O. lævigatum, Boiss. ♃ .5 to .7, glabrous, procumbent at base, stems ascending, slender, paniculate above. Leaves .006 to .02 long, *oblong-elliptical,* obtuse or acutish, entire or obscurely repand. Spikes short-peduncled, .005 to .01 long, .005 broad, few-flowered, loose; bracts green or red, lenticular, .005 long, .002 broad, as long as calyx; calyx *not dotted* — Summer — Amanus, and northward.


Fig. 284.


Terminal branches of panicle of Origanum lævigatum.

Var. **laxum,** Post. Spikes loose, bracts narrow, green, spreading, longer than calyx — Aintâb. Perhaps a mere monstrosity.

4. O. Ehrenbergii, Boiss. ♃ .5 to .8, sparingly hairy below, glabrous, pale green above; stems simple, wandlike. Leaves glandular-dotted, *ovate,* obtuse, .01 to .015 long, the lower short-petioled, the upper sessile. Spikes nearly sessile, *somewhat remote, axillary, loose,* forming a long thyrsus; bracts *obovate to oblong-spathulate,* glandular-dotted; calyx glabrous or hirsute, *glandular-dotted* — Summer — Middle to subalpine Lebanon.

5. O. Dayi, Post. (Bull. Herb. Boiss. I. 405.) ♃ .4 to .8, *covered everywhere with sessile glands, glutinous,* sparingly hairy, shrubby below; stems numerous, simple or sparingly branched; branches brittle. Leaves *cordate-ovate,* spreading, at length deflexed, .005 to .01 long and broad, prominently nerved. Spikes short-peduncled, .02 to .03 long,

Fig. 285.



Spike of Origanum Dayi.

.005 broad, flowering toward apex, loose, *racemed along branches from lower third up in a loose thyrsus* .03 to .04 broad; bracts prominently veined, ovate-orbicular, cordate or cuneate at base, mucronate, a little more than half as long calyx; calyx-tube once and a half as long as lanceolate teeth; corolla white, nearly twice as long as calyx; stamens long-exserted, nearly twice as long as corolla — Summer — Sunny hill-sides on the eastern declivity of the Judæan plateau between Hebron and Zuweirat-el-Foqa.

6. O. vulgare, L. ♃ Marjoram. .5 to .8 or more, more or less hirsute. Leaves petioled, ovate to oblong, repand, .01 to .02 long. Spikes *dense*, .01 to .015 long, .004 to .005 broad, cylindrical to prismatic, more or less panicled or corymbed; bracts generally colored, glandular-dotted, ovate-elliptical, acute; calyx glabrous, glandular-dotted — Summer — Subalpine Lebanon; Sinai.

Var. **viride,** Boiss. Bracts green, smaller, glabrous or hairy — Amanus.

Var. **prismaticum,** Blanche. Spikes *dense*, prismatic; bracts colored — Around Ehedin (Lebanon).

Var. **laxiflorum,** Post. Spikes *loose*, .015 to .02 long; bracts green — Neba'-el-Qâ'a, Ain-Zeḥalta (Lebanon).

Var. **longespicatum,** Post. Spikes .02 to .03 long, dense, prismatic; bracts green — Near Jebâ' (Lebanon).

* * * *Bracts* .002 *to* .003 *long, densely imbricated. Calyx top-shaped, split along its anterior face,* 1-*lipped.*

7. O. Maru, L. ♄ Za'tar. .5 to 1, shrubby at base; branches erect, stiff, hairy. Leaves nearly sessile, ovate to ovate-oblong, obtuse, .01 to .03 long, canescent, thick. Spikes oblong, .006 to .01 long, at length cylindrico-prismatic, in short-peduncled cymes, paniculate; bracts woolly, 4-ranked, *obovate*, as long as calyx; calyx entire or obsoletely retuse — May to October — Terrace walls and rocks; common throughout.

Var. **Sinaicum,** Boiss. Indument more scattered, less white — Sinai.

Var. **capitatum,** Post. Spikes few-flowered, globular-ovate, .005 long — Coast of Syria.

O. Maru may be the *Hyssop* of Scripture. The aromatic powder of the spikes and leaves is a favorite condiment in the East.

8. O. Onites, L. ♄ Shrubby at base; branches erect, thick, papillose-hirsute and minutely glandular. Leaves tomentellous, greyish, ovate, *somewhat serrate*, the lowest short-petioled, the others sessile, acute. Spikes ovate, compact, *crowded into a flattish, compound corymb;* floral-leaves oblong-lanceolate, *shorter than spreading peduncles;* bracts in 4 rows, *ovate-orbicular*, acutish, nerved, hirtulous, *hood-*

ed, somewhat longer than calyx; calyx obsoletely 3-toothed — Summer — Said by Aucher to be found in Syria.

5. THYMUS, L. Thyme. *Za'tar.*

Calyx ovoid, 10-13-nerved, bilabiate, with villous throat, the anterior lip composed of 2, subulate teeth, the posterior of 3, triangular or lanceolate teeth. Corolla-tube included or exserted, naked within; limb somewhat bilabiate, the anterior lip spreading, trifid, the posterior nearly flat, retuse. Stamens 4, straight, the anther-cells parallel or divergent. Nutlets ovate or oblong — Perennial herbs or shrubby plants.

* *Calyx terete, corolla included or scarcely exserted.*

1. T. Serpyllum, L. ♃ .15 to .25, tufted; lower branches prostrate-rooting or ascending, puberulent all over or in lines. Leaves ovate-elliptical to linear, .005 to .012 long, rounded or more or less tapering at base, short-petioled. Whorls sessile, the upper crowded into a head, the lower more or less distant; pedicels somewhat shorter than calyx; corolla pink — June to September — Fields; especially in mountain and subalpine regions.

Var. **genuinus,** Boiss. Leaves small, flat, linear-elliptical to elliptical, glabrescent. Flowers capitate.

Var. **Kotschyanus,** Boiss. Woody, erect. Leaves *rounded* or *cuneate-ovate to lanceolate or elliptical*, with prominent nerves below. Base of spike sometimes interrupted. Calyx-teeth ciliate. Corolla generally white — Amanus, Akherdagh, and northward.

Var. **angustifolius,** Boiss. Decumbent. Leaves *oblong-linear*, ciliate at base, sometimes tomentellous. Heads usually compact — Sands near Gaza and southward.

Var. **squarrosus,** Boiss. Branches short, generally velvety. Leaves *minute*, elliptical to ovate, spreading, often somewhat recurved and channeled, the floral nearly similar. Heads ovate or oblong; corolla white — Amanus.

2. T. hirsutus, M. B. ♃ .1, tufted, matted, stems procumbent from a woody root; new branches filiform, densely leafy, leaves clustered in axils. Leaves not dotted, sessile, *linear-subulate*, .008 to .005 long, obtuse, *margins revolute*, ciliate. Heads oblong, floral leaves somewhat broader than flowers; bracts subulate; calyx *reddish*, hirsute, bilabiate beyond its middle; corolla pink — Summer — Ascent from Buswayeh to Rijâl-el-'Asherah (Northern Lebanon).

3. T. decussatus, Bth. Lab. ♄ *Za'terân.* .2 to .3, branches slender, tomentellous, erect, rigid, intricately branched, the older spinescent. Leaves .003 to .004 long, grey-tomentellous, linear, revolute-margined, obtuse, crowded, *strongly decussated*, 4-*ranked on the sterile twigs, the floral similar.* Flowers few, in small heads; pedicels shorter than calyx; calyx glandular-punctate and hispidulous, bilabiate to near middle; corolla *white* — Summer — Sinai.

4. T. Syriacus, Boiss. ♄ .2 to .5, branching from base into stiff, simple, hirtellous, whitish branches. Leaves glandular-dotted, sessile, rigid, spreading, *linear-lanceolate*, .01 to .02 long, .001 to .002

broad, dotted, sparingly ciliated at base. Head terminal, ovate, *dense*, .01 to .03 long; bracts *ovate-oblong*, 5-7-nerved, hirsute, about as long as calyx; lips of calyx about of equal length; corolla white, glandular-dotted, nodding — Summer — Cœlesyria and Antilebanon to Palmyra, Aleppo, Amanus, and northward, and eastward.

Var. **Trachoniticus,** Post. (Jour. Linn. Soc. Lond. Bot. XXIV. p. 438). Dwarf; stems woody, tortuous. Leaves lenticular-lanceolate. Heads few-flowered; bracts narrow, *ovate-oblong*, much longer than calyx, nearly hiding the small flowers — May — In fissures of the lava, near Braq (el-Leja).

* * *Calyx terete. Corolla-tube long-exserted.*

5. T. Alfredæ, Post. ♄ (Pl. Post. Fasc. III. p. 15). .05 to .1, tufted, matted, stems woody, procumbent, rooting; flowering branches erect, velvety. Leaves in 4 rows, velvety, *linear-subulate*, .007 to .01 long, obtuse, margins revolute; floral leaves similar. Head terminal, loose, few-flowered, ovate, scarcely .01 long; calyx reddish green, the upper lip with 3, short teeth, the lower parted into 2, long, subulate teeth, all ciliate; corolla pale pink or white, tube once and a half as long as calyx — July and August — Matted on surface of rocks, a little to the west of the Rankûs Pass of Jebel Qalamûn (Antilebanon).

Fig. 286.



Segment of stem, and flowering branches of Thymus Alfredæ.

* * * *Calyx flattened, 2-edged. Corolla exserted.*

6. T. capitatus, L. ♄ *Za'tar Farisi.* .2 to .4, canescent; branches thick, stiff, *at length spinescent.* Leaves stiff, *linear, triquetrous*, .002 to .004 long, dotted, ciliate at base, with clusters of young leaves in axils. Head ovate, dense, .006 to .008 long; bracts ovate and oblong, cucullate, ciliate, *densely imbricated, concealing calyx;* upper lip of calyx with short connivent teeth, the lower longer, with subulate teeth — June to October — Coast and coast range of Palestine and Lebanon; Gilead.

6. SATUREIA, L. Summer Savory.

Calyx campanulate, either obscurely 10-13-nerved and equally 5-toothed, or obscurely bilabiate with somewhat unequal teeth. Corolla-tube included or exserted, naked within, the upper lip erect, flat, entire or retuse, the lower 3-cleft. Stamens 4, connivent under the upper lip, or exserted and somewhat divaricate, anthers with parallel or divergent cells — Annual herbs or shrubby perennials.

* *Annuals. Calyx-teeth equal.*

1. S. hortensis, L. ⊙ ♃ .2 to .5, scabrous with curved hair, much branched from base; branches filiform, erect or spreading. Leaves oblong-linear, .01 to .015 long, tapering to a short petiole.

Clusters 1-3-5-flowered, axillary, remote, the lower short-peduncled, the upper sessile; calyx-teeth linear-lanceolate — June to September — Aintâb to Marash, and northward.

Fig. 287.

Tip of branch of Satureia hortensis.

* * *Low shrubs. Calyx-teeth equal.*

2. S. cuneifolia, Ten. ħ .3 to .5, glabrous or hispidulous, especially above; branches ascending, stiff, ending in a slender, long, interrupted spike. Lowest leaves *obovate to oblong-spathulate*, tapering at base, upper linear-spathulate, .005 to .01 long, all acute, more or less plicate, recurved. Clusters several-flowered, short-peduncled or sessile; calyx-teeth triangular-lanceolate — August and September — Subalpine Lebanon; Beersheba, and southward.

* * * *Low shrubs. Calyx subtended by long bracts, teeth equal.*

3. S. Thymbra, L. ħ .3 to .5, scabrid-canescent, with many tortuous-branched stems, the younger erect. Leaves *oblong-obovate*, cuneate, folded lengthwise, acuminate, long-tapering at base, sessile. Upper axils with short branches. Whorls many-flowered, sessile, *globular*, forming an interrupted spike or thyrsus; bracts *oblong, acuminate, as long as calyx;* calyx-teeth lanceolate-subulate — April to June — Coast and mountains to subalpine regions.

7. MICROMERIA, Bth. Micromeria.

Calyx tubular or obconical-campanulate, 13-nerved, nearly equally 5-toothed. Corolla-tube exserted or included, naked within, the upper lip erect, nearly flat, the lower trilobed. Stamens didynamous, ascending, curved at apex, with 2-celled anthers — (Ours) perennial herbs or shrubs, with whorls in long, interrupted spikes.

* *Anther-cells implanted on the extremities of a long connective.*

† *Nutlets acute or mucronate.*

1. M. nervosa, Desf. ♃ .2 to .4, short-pubescent or glabrescent below, villous above, branching from prostrate base; stems simple or sparingly branched, ascending. Leaves sessile, with revolute margins, somewhat *cordate at base, ovate, acutish*, .005 to .008 long. Cymes *hispid*, many-flowered, short-peduncled, the lower distant; calyx-teeth *bristle-like;* corolla pink — April to June — Rocks; coast, and mountains of coast and interior to 1000 m.

2. M. Juliana, L. ♃ .3 to .6, pubescent or villous; rootstock woody, branches numerous, erect, stiff, simple. Leaves sessile, revolute-margined, *ovate-oblong to linear*, .005 to .008 long. Cymes *pubescent, nearly sessile, very dense, half globular*, the lower distant; calyx-teeth *awl-shaped*, connivent, throat naked; corolla pink, with included tube — May to July — Rocks; coast, and mountains to 1000 m.

Var. **myrtifolia,** Boiss. All the leaves ovate or oblong, the lower somewhat petioled — Phœnician coast to Marash.

3. M. cristata, Griseb. ♃ .02 to .07, puberulent, canescent; rootstock woody, stems tufted, filiform, naked at base, or densely

leafy, simple. Leaves sessile, oblong to lanceolate, obtuse, .004 to .007 long, concave and 3-nerved below. Cymes 1-3-flowered, short-peduncled, shorter than axillary leaf, *in a continuous, slender spike;* calyx-teeth lanceolate, teeth villous: corolla *purple* — Summer — Ehedin (Blanche).

† † *Nutlets obtuse.*

4. M. Græca, L. ♃ .3 to .6, pubescent or villous; rootstock woody, with slender, ascending, usually simple branches. Leaves sessile, ovate to ovate-oblong, .005 to .01 long, the upper lanceolate to linear. Cymes peduncled, 3-7-flowered, one-sided; calyx-teeth awl-shaped, ascending, *throat villous;* corolla pink, with somewhat exserted tube — May to July — Rocks; coast, and mountains of coast and interior to 1300 m.

Var. **laxiflora,** Post. Canescent. Cymes *loose,* 1-7-flowered — Subalpine Lebanon; Zaḥleh.

Var. **densiflora,** Post. Cymes *dense,* short-peduncled — Subalpine and alpine Lebanon; Zaḥleh.

5. M. Sinaica, Bth. ♄ *Suleiseleh.* .2 to .4, appressed-canescent, much branched, the younger branches erect, thickish, nearly or quite simple. Leaves few, remote, nearly sessile, ovate to oblong, .004 long, with somewhat revolute margins. Whorls sessile, many-flowered, small, remote; calyx .015 to .02 long, scabridulous, with lanceolate, straight teeth less than half as long as tube — Early summer — El-Ghôr; El-'Arabah, and southward to Sinai.

* * *Anther-cells divergent, joined at tip by a punctiform connective.*

6. M. nummularifolia, Boiss. ♃ .05 to .1, pale green, *villous, especially above;* stems filiform, brittle, leafy, ascending. Leaves round-ovate to ovate, subcordate, .003 to .006 long, the lower obtuse, the upper acutish. Flowers *solitary or twin,* short-pedicelled, forming an *ovate-oblong, terminal, leafy raceme;* calyx-teeth *nearly twice as long as tube, lanceolate-subulate;* corolla purple, *tube a little longer* than calyx — June to September — Alpine and subalpine summits of Lebanon and Hermon.

7. M. Libanotica, Boiss. ♃ .05 to .25, woolly-canescent; stems filiform, brittle, simple, erect. Leaves sessile, orbicular to ovate, obtuse, .005 to .012 long. Cymes short-peduncled, 7-2-*flowered, remote, loosely racemed,* sometimes somewhat panicled; calyx-teeth *one fourth to one fifth as long as tube, triangular-acuminate;* corolla pink, *once and a half to twice as long* as calyx — July to September — Alpine Lebanon and Antilebanon.

Fig. 288.



Flowering branch, and lower leaf of Micromeria Libanotica.

8. M. Shepardi, Post. (Jour. Linn. Soc. Bot. Vol. XXIV. p. 439, under Nepeta). ♃ .2 to .5, appressed-velvety, greyish-white; stems numerous, *simple,* or branching from woody base, *stiff.* Leaves rhombic-ovate, tapering to a short petiole, obtuse, .01 to .005 long, entire. Cy-

mules opposite, short-peduncled, distant; calyx-teeth triangular-ovate, acute, callous-tipped, one fourth as long as tube; corolla white, twice to twice and a half as long as calyx, tomentellous; lower lip somewhat longer; longer stamens long-exserted — Summer — Rocks; Palmyrene Desert; Aintâb.

Near M. mollis, Bth., but differs by *simple, stiff, straight branches, short peduncles*, etc.

Fig. 289.

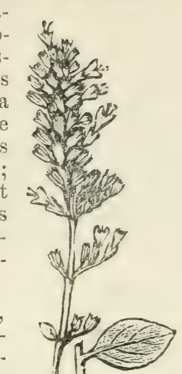


Fig. 290.

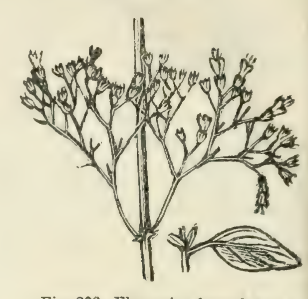


Fig. 289. Flowering branch and lower leaf of Micromeria Shepardi.

Fig. 290. Cymes from middle of stem of Micromeria serpyllifolia, with a leaf from lower down.

9. M. serpyllifolia, M. B. ♃ .5 to 1, very finely puberulent, *greyish-white;* stems stoutish, simple or *long-paniculate above.* Leaves petioled, *cuneate at base, ovate-oblong*, .01 to .035 long, entire or somewhat repand, the upper acutish. Cymes peduncled, *many times dichotomously branched;* calyx-teeth *triangular, one sixth* as long as tube, *as long as villi of throat;* corolla thrice as long as calyx — July to September — Rocks; coast, and mountains to 1000 m.; Northern plains.

8. THYMBRA, L. Thymbra.

Calyx oblong, 13-nerved, flattened at back, somewhat two-edged, bilabiate, the upper lip tridentate, the lower bipartite. Corolla-tube exserted, naked within, the upper lip erect, retuse, flattish, the lower trifid. Stamens under the upper lip, didynamous, the anthers with two, parallel cells — A low shrub, with the aspect of Thyme.

T. spicata, L. ♄ .2 to .5, branches puberulent in 2 rows, ascending, simple or sparingly branched. Leaves linear-lanceolate, .01 to .02 long, dotted, flat or folded lengthwise, glabrous or ciliate. Spikes oblong, dense, .015 to .07 long, .015 broad, sometimes interrupted at base; floral leaves and bracts more or less reddish, ciliate, concealing the calyces; corolla purple, twice as long as calyx-tube — May and June — Dry places; coast, and coast range to 1000 m., to Aintâb, Marash, and northward.

Fig. 291.



Spike of Thymbra spicata.

9. CALAMINTHA, Mœnch. Calaminth.

Calyx tubular, 13-nerved, more or less bilabiate, the upper lip tridentate, the lower with two, awl-shaped teeth. Corolla-tube straight, the upper lip flat or slightly concave, the lower trifid. Stamens ascending in pairs, more or less connivent, anthers with parallel or divergent

cells — Annual or perennial herbs, sometimes with a shrubby base.

* *Whorls forming compound cymes. Corolla-tube not ringed within.*

1. C. grandiflora, L. ♃ .4 to .8, sparingly hairy; rootstock creeping; stems ascending, simple. Leaves petioled, ovate to oblong, .03 to .05 long, *coarse-toothed*, the lowest somewhat cordate, the others rounded or cuneate at base. Cymes 3-7-1-flowered, peduncled; *bracts linear-lanceolate;* calyx .01 long, *upper teeth ovate, acuminate, lower subulate;* corolla pink, .02 to .03 long — June — Amanus.

Fig. 292.



Calamintha betulifolia.

2. C. betulifolia, Boiss. et Bal. ♃ .3 to .4, stems ascending, simple, or sparingly branched below, puberulent above. Leaves petioled, ovate, .015 to .03 long, *acutely denticulate*, the lowest rounded or truncate at base, the upper cuneate. Cymes 3-7-1-flowered, short-peduncled; *bracts oblong-rhombic;* calyx .008 to .01 long, *with equal, triangular, acute teeth;* corolla pink, .02 to. 03 long — Summer — Bitias in Amanus, and northward.

3. C. officinalis, Mœnch. ♃ .5 to .8, hairy; rootstock creeping; stems erect, simple or sparingly branched. Leaves petioled, ovate, .01 to .03 long, cuneate at base, dentate-serrate to crenate. Cymes peduncled, loose, the lower as long as leaves, the upper longer; bracts minute, subulate; pedicels as long as calyces or longer; upper calyx-teeth lanceolate, recurved, the lower longer, straight, linear-subulate; corolla pink, .01 to .015 long, twice to thrice as long as calyx — July — Amanus.

4. C. Nepeta, L. ♃ .3 to .6, canescent; stems simple or branched from ascending base, panicled above. Leaves petioled, *ovate-rhombic*, .005 to .02 long, obtuse, *crenate*. Cymes axillary, one-sided, rather dense, longer than floral leaves, forming a loose raceme or thyrsoid panicle; bracts *minute, subulate;* calyx .005 long, with unequal teeth, the upper lanceolate, the lower subulate; corolla white, .007 to .01 long — Late summer and autumn — Hedges, Alexandretta; Amanus, and northward.

5. C. incana, S. et Sm. ♃ .2 to .5, *densely canescent; stems decumbent*, branching. Leaves petioled, *round*, .003 to .01 in diameter, *entire or obsoletely crenate*, nerved. Cymes sessile, 6-2-1-flowered, racemose-spiked; pedicels as long as calyx or shorter; calyx .003 to .004 long, with villous throat, short-3-denticulate upper lip, and longer lower lip with 2, lanceolate-subulate teeth; corolla cream-colored, twice as long as calyx — August to October — Fields; coast, and coast range to 1200 m.; Jaulân; Hamath to Aleppo, and northward.

6. C. Clinopodium, Bth. ♃ Wild Basil. .4 to .8, pubescent or villous; stems *erect, stout,* simple or branching. Leaves short-petiol-

ed, ovate to oblong-ovate, .015 to .04 long, somewhat crenate, rounded at base. Whorls sessile, dense, *half-globular*, remote, *the terminal forming globular to oblong heads*, .015 to .03 long, .015 to .03 broad; *bracts plumose, especially numerous at base of whorl;* calyx-teeth *bristle-like, plumose;* corolla purple, twice to thrice as long as calyx — May to August — Shady and dry places, especially in mountains.

Fig. 293.



Head of Calamintha Clinopodium.

Fig. 294.



Whorl of Calamintha origanifolia.

* * *Whorls forming compound cymes. Corolla-tube with a ring of hairs within.*

7. C. origanifolia, Lab. ♃ .3 to .4, glabrous or appressed-velvety, or scurfy, greyish; rootstock and trunk woody; branches slender, flexuous, simple or sparingly branched. Leaves nearly sessile, *orbicular-ovate to ovate*, .006 to .01 long, remote, entire. Whorls 3-4, remote, many-flowered, short-peduncled; bracts oblong-spathulate to linear-lanceolate, acuminate, as long as calyx; upper calyx-teeth triangular-acuminate, lower lanceolate-subulate; corolla-tube scarcely exserted — July to October — Alpine summits of Lebanon.

* * * *Whorls composed of stiff, unbranched pedicels. Corolla-tube not ringed.*

8. C. graveolens, M. B. ⊙ .1 to .2, villous-canescent, branching from base and above; branches ascending. Leaves .005 to .008 long, with curved, prominent nerves, obovate, ovate, or ovate-orbicular, acute, *tapering into a petiole longer than the blade*, the floral longer than the flowers. Whorls 4-6-flowered, remote or crowded; calyx nearly sessile, *somewhat gibbous at base, incurved*, with awl-shaped teeth half as long as tube; corolla-tube included, limb minute — April to June — Subalpine and alpine Lebanon and Antilebanon; Ḥaurân.

10. MELISSA, L. Balm.

Calyx campanulate, 13-ribbed, bilabiate, with the tube flattened behind, the upper lip flattish, 3-toothed, and the lower bipartite. Corolla-tube exserted, ascending-recurved, naked within, the upper lip erect, retuse, the lower spreading, trifid. Stamens 4, ascending, connivent under upper lip, the anther-cells divaricating — Perennial herbs, with white flowers.

M. officinalis, L. ♃ .6 to 1, more or less villous or hirsute, branching. Leaves petioled, ovate, often cordate, .02 to .06 long, more or less crenate to serrate-dentate. Cymes axillary, nearly sessile, 3-5-flowered, forming a one-sided, interrupted, leafy spike; pedicel at

length nodding; upper lip of calyx very short, reticulate, with very short, mucronate teeth, lower longer, with lanceolate-aristate teeth; corolla .015 long, twice as long as calyx — June to September — Shady places; along coast, and mountains to 900 m.; Jebel-ed-Durûz (Ḥaurân); Amanus, and northward.

11. SALVIA, L. Sage. *Qoṣ'in.*

Calyx campanulate, ovoid, or tubular, more or less distinctly bilabiate, the upper lip 3-toothed, rarely entire, the lower deeply 2-cleft. Corolla-tube included or exserted, its inner face naked, or furnished with a hairy ring or a penicillate scale, the upper lip concave, straight or falcate, the lower spreading, trifid, with the middle lobe broader than the others. Perfect stamens 2, with short filaments and a long connective astride their tip, the posterior limb of the connective ascending, bearing a fertile cell, the anterior straight or deflexed, bearing a barren or fertile cell, or naked. Posterior staminoids minute or **0** — Shrubs or herbs; inflorescence whorled.

* *Anterior part of connective ending in an empty cell or bulbous callosity.*

† *Corolla-tube hairy-ringed within. Upper lip nearly straight. Anterior anther-cell empty.*

‡ *Calyx (except S. pinnata) enlarging but little in fruit. Teeth acute.*

§ *Leaves simple.*

1 S. Aucheri, 2 grandiflora, 3 Libanotica.

§ § *Leaves pinnately lobed or parted.*

4 S. triloba, 5 suffruticosa, 6 Nusairiensis, 7 spireæfolia, 8 potentillæfolia, 9 Peyroni, 10 pinnata, 11 recognita, 12 rubifolia, 13 purpurascens, 14 bracteata.

‡ ‡ *Fruiting calyx enlarged, veined, often colored.*

15 S. Rasheyana, 16 acetabulosa, 17 Pinardi.

† † *Corolla-tube hairy-ringed within. Upper lip falcate. Anterior anther-cell empty.*

18 S. glutinosa.

† † † *Corolla-tube naked within, or with a penicillate scale. Anterior part of connective ending in a bulbous, callous tip.*

‡ *Calyx campanulate, upper lip convex, 3-toothed. Upper whorls often abortive.*

§ *Corolla-tube gradually dilating into a throat, naked within.*

19 S. Syriaca, 20 Montbretii, 21 spinosa, 22 Palæstina.

§ § *Corolla-tube ending abruptly in a pouched throat, with a penicillate scale within.*

23 S. graveolens, 24 Sclarea, 25 ceratophylla, 26 verbascifolia, 27 brachycalyx, 28 Peratica.

‡ ‡ *Calyx obovate, upper lip concave, 2-grooved, with 3, short, connivent teeth.*

29 S. Hierosolymitana, 30 virgata, 31 viscosa, 32 Verbenaca, 33 controversa.

‡ ‡ ‡ *Calyx tubular, upper lip truncate, remotely 2-dentate. Annuals.*
34 S. viridis, 35 Horminum.

‡ ‡ ‡ ‡ *Calyx ovate to tubular-campanulate, upper lip 3-toothed.*
36 S. Ægyptiaca, 37 deserti.

* * *Anterior part of connective subulate, destitute of a cell or callosity.*
38 S. Judaica, 39 Russelii.

1. S. Aucheri, Bth. ♃ .6 to .8, woody at base, stems procumbent, rooting at base, erect, pubescent to glabrous, ending in a naked panicle. Leaves oblong, .04 to .08 long, minutely crenulate, finely wrinkled, glabrescent or minutely puberulent at upper surface, canescent at lower, rounded at base, petioled. Branches of panicle elongated, ascending ; whorls 4-2-flowered ; bracts *scale-like, deciduous;* flowers subsessile ; calyx glandular-hirtulous, teeth lanceolate, nearly equal, *one-fourth* as long as tube: corolla violet, thrice as long as calyx — August and September —

Var. **canescens,** Boiss. et Held. Leaves more or less canescent at upper as well as lower surface. Calyx .006 long, teeth triangular, broader than long — Woods; Kai-pok-Dagh (Amanus), and northward.

2. S. grandiflora, Ettling. ♃ .6 to 1 or more; stems ascending, puberulent. Leaves petioled, rounded or cordate at base, ovate to oblong, .04 to .1 long, minutely crenulate, rugulose, pubescent or glabrescent at upper surface, canescent at lower, the upper acuminate. Flowers racemed or panicled, whorls 10-2-flowered, distant; bracts small, somewhat membranous; calyx viscid-hairy, reddish, somewhat 2-lipped, .015 long, teeth triangular-lanceolate; corolla blue, twice to thrice as long as calyx — June to August — Coast to subalpine Lebanon; Cassius Amanus, and northward.

Var. **cuneata,** Post. Leaves cuneate at base, obovate-oblong, .02 to .03 long, the lower obtuse, the middle acutish, the uppermost oblong-linear, acute. Raceme short, dense — Around Mt. Cassius; Antioch.

3. S. Libanotica, Boiss. et Gaill. ♃ .3 to .5, crisp-woolly, somewhat viscid; flowering branches erect, simple or sparingly branched. Leaves petioled, rounded or truncate at base, oblong, obtuse, .02 to .03 long. Whorls 4-8-flowered, somewhat distant; pedicels shorter than calyx; calyx .007 to .01 long, teeth triangular, acute, one fourth as long as tube; corolla *scarcely twice as long* as calyx — May — Lower zone of Lebanon. Probably a variety of the following.

4. S. triloba, L. ♃ .5 to 1.5, woolly-canescent. Leaves oblong to lanceolate, obtuse, .02 to .05 long, truncate or rounded or cordate at base, *generally with one or two small, ovate-elliptical leaflets at base;* the upper leaves *more or less triangular-auricled at base.* Inflorescence an interrupted spike or short-branched panicle, viscid; whorls 6-4-flowered; bracts minute, scale-like; calyx .006 long, slightly bilabiate, teeth triangular, one fourth as long as tube; corolla violet, *twice to thrice as long* as calyx — April to July — Dry places; coast, and coast range of mountains to 800 m.

5. S. suffruticosa, Montb. et Auch. ♃ .5 or more, branches herbaceous, glabrous, erect, slender, *whitish,* leafy. Petioles stiff, white,

hirtulous, leaflets 1-2 pairs, *oblong-lanceolate*, rather obtuse, *nearly entire*, the terminal tapering at base; the uppermost leaves small, divided *into few, linear leaflets.* Whorls distant, 6-4-flowered; floral leaves ovate, acuminate, all but lowermost shorter than calyx; pedicels short; calyx .01 long, teeth lanceolate, *ending in a yellow, spinescent point;* corolla *yellow*, twice to thrice as long as calyx — Summer — Aintâb, and northward.

6. S. Nusairiensis, Post. (Bull. Herb. Boiss. I. 406). ♃ 1 or more, indurated at base; stems erect, appressed-puberulent, leafy-paniculate almost from base. Leaves *trifoliate*, leaflets ovate-oblong, rugulose, crenulate, stellate-tomentellous, greenish at upper greyish-canescent at lower surface, the lateral sessile, ovate-oblong, rather obtuse, .01 to .015 long, .005 to .013 broad, the terminal leaflet .03 to .07 long, .02 to .04 broad. Bracts minute, ovate, acuminate, deciduous; flowers short-peduncled; calyx reddish-green, tubular-campanulate, .013 to .015 long, ribbed, glandular, sparingly papillose-pubescent at ribs, teeth triangular, the lower somewhat longer than the upper, about half as long as tube; corolla blue, about twice as long as calyx — August — Woods east of el-Juweikhât (Nusairy Mountains).

7. S. spireæfolia, Boiss. et Hoh. ♄ .4 to .6, branches erect, glabrous, herbaceous, nearly simple, leafy. Petioles hirsute; leaves of 2-3 pairs of *elliptical to lanceolate, acutely dentate*, papillary-hirsute leaflets, the terminal larger, elliptical-oblong; the uppermost leaves with linear leaflets. Whorls 6-4-flowered, distant; bracts ovate, acuminate, shorter than calyx; calyx short-pedicelled, appressed-pubescent, .008 long, upper lip with 3, short teeth, lower *longer*, with 2, *acute or mucronate teeth;* corolla pale blue, twice to twice and a half as long as calyx — April — Aleppo, and north-eastward.

8. S. potentillæfolia, Boiss. et Held. ♄ .4 to .5, branches simple or sparingly branched, slender. Leaves small, petioled, *ternate* into subsessile, oblong-cuneate leaflets, .01 to .015 long, *denticulate near tip*, the intermediate somewhat longer. Whorls 4-2-flowered, distant; floral leaves *lanceolate, minute, the lower 2-3-parted;* pedicels shorter than calyx; calyx .01 long, glandular-hairy, *bilabiate to one third of its length*, the upper lip 3-denticulate, *the intermediate tooth minute, the lateral mucronate*, the lower lip split into lanceolate, long-acuminate teeth; corolla yellow turning blue, or bicolored, twice and a half as long as calyx —

Var. **microphylla,** Boiss. Leaflets smaller — Duden near Elmalu in northern Syria.

9. S. Peyroni, Boiss. ♃ 1 or more, stems erect, branching above, branches opposite, glabrous except glandular-hispid inflorescence. Leaves *all radical or at base of stem*, long-petioled, with two pairs of oblong-lanceolate, crenate, usually small leaflets, the terminal larger, .05 long. Whorls 5-3-flowered, distant, forming a long raceme; flowers short-peduncled; calyx bilabiate to one third of its length, teeth triangular at base, *subulate-aristate*, prickly; corolla golden-yellow, thrice as long as calyx — June — Among rocks at Feitrûn.

10. S. pinnata, L. ♃ .3 to .5, glandular-hirsute, viscid, pale-green, stems ascending, simple or panicled, leafy. Leaves petioled, *interruptedly pinnate, with* 3-4 *pairs or* 6-8 *alternate, petiolulate, ovate to oblong, incised-crenate leaflets* .02 *to* .03 *long, intermixed with smaller ones.*

Floral leaves deciduous, scaly; whorls 6-4-flowered, remote; pedicels nearly as long as calyx; calyx woolly, *urceolate*, .008 long, .006 broad in flower, .015 long and broad in fruit, *truncate, lips and teeth nearly obsolete;* corolla purple, twice as long as calyx or more — Spring — Fields; coast, and mountains to 1000 m., on both sides of Jordan, to Aintâb and northward.

11. S. recognita, F. et M. ♃ 1 to 1.5, stems erect, hispid below then glabrescent, leafy, ending in a long, glandular-villous raceme or few-branched panicle. Leaves pale-green, puberulent and at the under surface of the nerves papillary-hirsute, wrinkled; leaflets 3-5, crenate, the lateral oblong to elliptical, .03 to .05 long, sometimes with minute leaflets between, the terminal ovate to oblong, .08 to .15 long, cordate or rounded at base; the upper leaves 0 or 2, smaller, leaflets lanceolate. Floral leaves ovate, small, deciduous; whorls 6-4-flowered, distant; flowers nearly sessile; calyx-lips ovate, the upper minutely 3-dentate, the lower cleft into 2, ovate, acuminate lobes; corolla pink, .03 long, twice and a half as long as calyx — June — Woods north of **Mt.** Cassius.

12. S. rubifolia, Boiss. ♃ .5 or more, green, papillose-hispid, viscid; stems procumbent, elongated, simple, at length glabrescent. Leaves petioled, leaflets 3, rarely 5, the terminal larger, ovate-cordate, the lateral .01 to .02 long, oblong, oblique at base, often petiolulate, all obtusely crenate. Floral leaves triangular-lanceolate, acuminate, much shorter than calyx; whorls 6-4-flowered, racemed; pedicels shorter than calyx, or nearly as long; calyx .015 to .02 long, bilabiate for one fourth of its length, teeth triangular at base subulate-aristate at tip; corolla bluish, twice as long as calyx — April — Lebanon and Antilebanon.

Var. **æqualifolia,** Post. Lateral leaflets nearly as large as terminal.

13. S. purpurascens, Post. (Journ. Linn. Soc. Bot. Vol. XXIV. p. 438). ♃ .5 to 1; stem glabrous, purplish especially at angles above. Leaves long-petioled, petioles hairy at margins and lower surface, leaflets 3, the lateral oblong-ovate, .02 to .03 long, the terminal cordate-ovate, .03 to .05 long, all sparingly papillose at lower surface, crenate or obtusely dentate; leaflets of upper leaves lanceolate. Floral leaves ciliate-margined, cordate-ovate, long-acuminate, *the lower much longer than calyx, the upper as long or a little shorter;* pedicels half as long as calyx or shorter; calyx more or less *purplish*, sparingly papillose, .015 long, bilabiate for a third or a fourth of its length, teeth triangular, acuminate, somewhat prickly; corolla blue, scarcely once and a half as long as calyx — May and June — Kurd-Dagh; Aintâb to Marash, and northward.

14. S. bracteata, Russ. ♃ .5 to .6 or more, glandular-hirsute, viscid, many-stemmed from a shrubby rootstock; stems ascending, paniculate-branched. Leaves petioled, leaflets crenate, the lateral usually one sometimes two pairs, those of lowest leaves small, round to ovate, of intermediate .02 to .04 long, ovate to oblong, the terminal larger, the upper stem-leaves subtending the branches, oblong in outline, undivided or more or less irregularly lobed or incised-dentate. Floral leaves sessile, persistent, *boat-shaped*, membranous and *pinkish or purplish at base*, herbaceous at tip, acuminate, somewhat recurved, *including the whorls and longer than the calyx;* whorls 8-6-flowered, remote;

calyx *sessile*, *hispid-viscid*, .01 to .015 long, the upper lip *longer*, oblong, undivided or slightly 3-toothed, the lower with ovate, acute teeth; corolla purplish, twice as long as calyx — May to July — Waste fields; Damascus to Aleppo, Aintâb, and northward.

15. S. Rasheyana, Boiss. ♃ .3, villous, viscid, pale green, branches simple, ascending. Leaves petioled, *pinnate* with three, rugose, crenulate, oblong, obtuse leaflets, the terminal .02 long, the lateral smaller. Floral leaves ovate, *small;* whorls 6-4-flowered, rather remote, raceme long; calyx sparingly glandular-hairy, short-bilabiate, upper lip somewhat the longer, with 3, broad, short teeth, the lower lip 2-dentate, all the teeth mucronulate; *fruiting calyx only* .015 *to* .02 *long, not expanded*, reticulate- nerved; corolla bluish, once and a half as long as calyx — Spring — Near Rasheya.

16. S. acetabulosa, Vahl. ♃ .3 to .5; stems numerous, ascending, simple, viscid-puberulent and hispid. Leaves petioled, wrinkled, ashy, some simple, ovate to oblong, .02 to .03 long, from a rounded or cordate base, obtuse, others with a pair of small leaflets distant from the terminal. Floral leaves sessile, oblong to ovate-acuminate, the lower longer than the whorls; whorls 8-4-flowered, distant; calyx hispid, campanulate before flowering, short-bilabiate, the upper lip somewhat longer, short-tridentate or nearly entire, the lower bidentate, with triangular, acutish teeth; fruiting calyx .02 long and broad, membranous, reticulate, greenish, yellowish, or pink; corolla once and a half as long as flowering calyx, purple — April to June — Aintâb, and northward.

Var. **simplicifolia,** Boiss. All the leaves simple — Fields; common in subalpine mountains and interior plains; Gilead.

17. S. Pinardi, Boiss. ♃ .3 to .5, branches tomentellous below, erect, stiff, glabrescent above. Leaves long-petioled, wrinkled, canescent with appressed, stellate wool, denser on lower surface, ovate to oblong, blade .015 to .07 long, crenulate, cordate, or rounded at base, sometimes with 2, lateral, minute leaflets. Floral leaves ovate, more or less acuminate; calyx glabrescent, upper lip obsoletely repand-3-toothed, lower with two, round-ovate lobes, in fruit .02 long, .015 broad, obsoletely reticulate; corolla blue, .02 long, once and a half to twice as long as flowering calyx — April to September — Moab to Haurân, Damascus, Antilebanon, Syrian Desert, and Antioch.

18. S. glutinosa, L. .5 to .6, stem erect, racemed or panicled above, glutinous especially at inflorescence. Leaves petioled, ovate-oblong, .05 to .2 long, *cordate-hastate at base*, coarse-toothed, pubescent. Floral leaves ovate, acuminate, about as long as pedicels or shorter; whorls 6-2-flowered, distinct; pedicels a little shorter than calyx; calyx .012 long, prominently nerved, upper lobe truncate, entire or 3-denticulate, lower bifid into ovate-triangular, mucronulate lobes; corolla *yellow, often lined and dotted with purple*, thrice as long as calyx — June to September — Woods and shady places; Amanus, Kurd-Dagh, and northward.

Var. **aristata,** Post. Lower calyx-teeth tapering-aristate — Kurd-Dagh.

19. S. Syriaca, L. ♃ .3 to .8, stems glabrescent or puberulent, sometimes branching from base, ending in a .2 to .3 broad and



FIG. 295. Salvia Syriaca.

FIG. 296. Terminal whorl of Salvia Montbretii.

long panicle. Leaves *yellowish green*, bullate-wrinkled, *puberulent*, *ovate-oblong* to ovate-lanceolate, .03 to .1 long, cordate at base, *crenate and incised.* Floral leaves ovate, acuminate, scarcely longer than pedicels; whorls 6-2-flowered, distant; calyx .008 long, obscurely bilabiate, the upper three teeth triangular, the lower two lanceolate, all prickly-mucronate; corolla *white*, hardly twice as long as calyx — April to July — Fields and vineyards; mountains of coast range to 1000 m.; interior plains.

20. S. Montbretii, Bth. ♃ .5 to .6, rootstock woody, thickened; stems erect, *tomentose below, ending in a viscid-villous raceme, simple or sparingly stiff-branched near base.* Lowest leaves crowded, woolly, greenish at upper canescent at lower surface, *oblong-spathulate or oblanceolate*, .04 to .1 long, .015 to .01 broad, entire or dentate, bullate-wrinkled, tapering to a petiole ; stem-leaves oblong-linear to linear, acute, sessile. Floral leaves as broad as long or broader, triangular-ovate, more or less tapering, boat-shaped, *forming an involucre shorter than calyx-tube, canescent and striate on their outer aspect; calyx* .013 *long, canescent, striate,* lips of equal length, the upper with 3, short-triangular, the lower with 2, lanceolate teeth, all prickly-mucronate; corolla *violet*, twice to thrice as long as calyx — May — Aintâb, and northward.

21. S. spinosa, L. ♃ .3 to .4, *viscid-pubescent*, especially above; stem ending in a *pyramidal panicle*, .2 to .3 broad. Leaves appressed-pubescent, canescent to pale green, *ovate*, .08 to .2 long, subcordate or rounded at base, *eroded-dentate, occasionally somewhat lobed,* the lower long-petioled, the upper somewhat clasping. Floral leaves *pale green*, round-ovate, cordate-clasping at base, acuminate, rather shorter than calyx; whorls 6-2-flowered; calyx .012 long, tubular, growing in fruit, bilabiate, with triangular-lanceolate, *prickly-aristate* teeth ; corolla white, once and a half as long as calyx — April to June — Sinai to Ḥaurân, Damascus, Aleppo, and eastward.

22. S. Palæstina, Bth. ♃ *Kharneh.* .3 to .8, *strigose;* stem ending in a panicle .2 to .4 broad. Leaves rugose, greenish to canescent, the lower long-petioled, oblong, .1 to .2 long, *often pinnatisect or*

lyrate at base of blade, the lateral *segments small, confluent*, and the terminal .08 to .1 long, .02 to .03 broad, crenate, *often lobed or incised.* Floral leaves membranous, often colored, *sparingly papillose-pubescent, orbicular to ovate, cuspidate*, shorter than calyx; calyx sparingly papillose, .015 long, growing in fruit, bilabiate, with lanceolate, prickly-mucronate teeth; corolla white, twice to thrice as long as calyx, the upper lip rather straight — April to June — Fields and hills; common even in deserts, and on mountains to 1200 m.

23. S. graveolens, Vahl. ♁ .4 to 1 or more, branches and petioles sparingly hirsute; stems numerous, ascending or erect, ending in *hispid* racemes or narrow panicles. Leaves appressed-canescent, bullate-wrinkled, crenate to undulate-lobed, *triangular-ovate to triangular-oblong*, .03 to .07 long, *truncate to cordate at base*, the lower short-petioled, the upper sessile. Floral leaves cordate-ovate, acuminate, shorter than calyx; whorls 6-4-flowered, the lower distant the upper approximated; calyx campanulate, .007 long, teeth triangular-ovate, *mucronate;* corolla white, with included tube and arched upper lip as long as calyx — March to June — Coast to middle zone of mountains, on both sides of Jordan, to Cœlesyria and Damascus.

24. S. Sclarea, L. ♃ *Kaff-ed-dibb.* .6 to 1 or more; stem stout, hirsute below, ending in a viscid, rather contracted panicle, .3 to .4 long. Leaves *green, sparingly scabrous*, more or less wrinkled, *cordate-ovate*, .08 to .2 long, crenate to dentate. Floral leaves *ovate-cordate, pink to whitish*, longer than calyces, at length deflexed; whorls distant, 6-2-flowered; calyx papillose-scabrous, .008 long in flower, .012 in fruit, campanulate-bilabiate, teeth ovate, *spiny-aristate;* corolla pinkish-blue, thrice as long as calyx, tube included — May and June — Shady places in lower and middle zone of coast ranges throughout; Amanus.

Var. **tomentosa,** Post. Stems hispid. Leaves woolly-canescent. Panicle thyrsoid.

25. S. ceratophylla, L. ♃ .5 to .7, woolly-canescent below and at leaves; stem erect, *broad-panicled from base;* panicle hispid-viscid, branches ascending. Leaves *covered with reddish, mammillary projections at upper surface*, densely woolly at lower, the lowest appressed to the ground, all *oblong in outline*, .1 to .2 long, *divided into oblong-linear, entire or pinnatifid lobes, axis winged wings more or less serrate.* Floral leaves green, ovate, long-acuminate, as long as calyx or shorter; whorls 6-4-flowered, distant; calyx papillose-hispid, .008 long in flower, .01 in fruit, lips at length divergent, teeth ovate, spiny-mucronate; corolla white, about twice as long as calyx — April to June — Haurân, Antilebanon, Hems, Aleppo, and eastward.

26. S. verbascifolia, M. B. ♃ .6 to 1, woolly-canescent below, hairy above; stem stout, ending in a raceme or spreading panicle. Lower leaves petioled, bullate-wrinkled, *elliptical to ovate and oblong*, .08 to .2 long, crenate and incised-lobed, cuneate-truncate to cordate at base, the upper few, sessile, oblong, acute to acuminate, coarse-dentate. Floral leaves *broader than long*, ovate, *abruptly short-acuminate, one-third to one-half as long as calyx;* calyx papillose, campanulate, .007 long in flower, .01 in fruit, green-ribbed, *middle tooth of upper lip very small*, all the teeth spiny-mucronate; corolla white to cream-colored, thrice to thrice and a half as long as calyx, tube included — June to September —

Var. **cana,** Boiss. *Fleecy below* — Subalpine Lebanon; Antilebanon plateau; Syrian Desert; Amanus to Akherdagh, and northward.

27. S. brachycalyx, Boiss. ♃ .8 to 1.5; stem sparingly pubescent, *leafy below*, naked above middle, ending in a panicle often .5 long and .4 broad. Lower leaves membranous, more or less papillose-pubescent, *ovate*, .06 to .35 long, truncate or cordate at base, eroded-dentate or sinuate-lobed; stem-leaves sessile, triangular-ovate, truncate at base. Floral leaves triangular-ovate, abruptly short-acuminate, the lower longer than calyx, the upper broader than long, shorter than calyx; whorls 6-4-flowered, distant; calyx viscid-pubescent, campanulate, .009 long in flower, very slightly enlarged in fruit, *almost truncate*, teeth very short and broad, spiny-mucronulate; corolla *bluish, four times as long as calyx*, with falcate upper and broad lower lips, and long-exserted stamens and style — May to July — Rocks and shady places; Jerusalem to Moab, Antilebanon, Aleppo, and eastward and northward.

28. S. Peratica, Paine. (Third statement, Palestine Exploration Soc. 118). ♃ .6 to 1, hispidulous, panicled above. Stem-leaves only one pair, *obovate*, .2 to .3 long, .1 broad, repand-sinuate, unequally bidentate. Floral leaves *deltoid or reniform*, cuspidate; whorls remote; calyx hairy, teeth one third to one fourth as long as tube, nearly equal, *subulate;* corolla *pink-purple*, .025 long — April — Eastern heights of Jebel Hosha' (Moab). Probably a variety of the last.

29. S. Hierosolymitana, Boiss. ♃ .4 to 1; stem *retrorsely scabrous at angles*, otherwise glabrous, ending in a papillose-viscid panicle .3 to .4 long. Radical leaves membranous, green, sparingly papillose, petioled, ovate to ovate-oblong, .1 to .25 long, obtuse, dentate and incised-lobed; stem-leaves 1-2-pairs, sessile. Floral leaves minute, triangular-ovate, acuminate; whorls 6-2-flowered, distant; calyx red, papillose-glandular, .008 to .01 long in flower, .015 in fruit; corolla *blackish-red*, thrice as long as calyx — April to June — Fields and rocks; Palestine on both sides of Jordan to Lebanon.

30. S. virgata, Ait. ♃ .4 to .6, papillose-pubescent, pale green; stem scarcely viscid, ending in a long panicle with wandlike branches. Leaves rugulose, ovate-oblong, cordate at base, obtusely crenate and lobed, the lower petioled, .1 to .15 long, the upper few, short-petioled and sessile, smaller, acute. Floral leaves minute, ovate-triangular, acuminate, *generally deflexed and colored;* whorls 6-4-flowered, distant; calyx .005 long, green, sparingly hirsute; corolla *blue or white*, twice to twice and a half as long as calyx — Summer — Moab ; Gilead ; Lebanon; Amanus to Aintâb, Marash, and northward and eastward.

31. S. viscosa, Jacq. ♃ .6 to 1, viscid-pubescent especially above, ending in a raceme or loose panicle, .3 to .4 long. Leaves more or less papillose-pubescent, especially at under surface, membranous, ovate-oblong, cordate at base, sinuate-repand, the lower long-petioled, .1 to .4 long, the middle and upper short-petioled or sessile. Floral leaves small, ovate, acuminate ; whorls 6-4-flowered, distant ; calyx nearly sessile, .006 long in flower, .01 in fruit, papillose-glandular; corolla *pink or red*, twice and a half as long as calyx — June and July — Lower to subalpine Lebanon.

32. S. Verbenaca, L. ♃ .3 to .5, pubescent, villous above ; stems ascending, simple or sparingly branched. Leaves *ovate to oblong*,

.03 to .1 long, *crenate*, wrinkled, glabrescent, round or cordate at base, *undivided, lobed, or pinnatifid*, the lowest petioled, .1 to .2 long, the upper sessile. Floral leaves minute, round-cordate, acuminate, at length reflexed; whorls 6-4-flowered, remote; calyx .005 to .006 long in flower, .008 and nodding in fruit, often colored, the upper lip half-orbicular; corolla *blue*, .01 to .012 long, upper lip somewhat incurved — November to June — Common everywhere.

Var. **serotina,** Boiss. Stems leafy, taller.

Var. **vernalis,** Boiss. Leaves mostly radical, narrow, deeply pinnatifid.

Var **angustifolia,** Post. Leaves linear-oblong, more or less pinnatifid or -sect — Cœlesyria; Valley of lower Jordan.

33. S. controversa, Ten. ♃ *Nu'eimeh. Shajaret-el-Jemâl. Barâjim. Maryamîyeh. 'Areim.* .2 to .35, appressed-canescent, and more or less hispid with longer hairs; stems numerous, simple or branching from near base. Leaves oblong in outline, pinnatisect into *linear, bullate-wrinkled*, obtuse, *crenulate* lobes, *set at right angles to axis, with revolute margins.* Floral leaves ovate-orbicular, acute; whorls 8-6-flowered, rather remote, or approximated; calyx *fleecy*, .005 long in flower, .008 in fruit; corolla *reddish*, twice to thrice as long as calyx, upper lip somewhat falcate — March to May — Sandy places; Sinai to Ḥaurân, Damascus, Qaryetein, and eastward.

34. S. viridis, L. ⊙ .2 to .4, villous, pale green; stem simple or sparingly branched from neck or above. Leaves petioled, rounded or subcordate at base, oblong to ovate, .03 to .07 long, crenulate, the upper sessile. Floral leaves ovate-rhombic, about as long as calyx, with a subulate bract on each side at base, *green, the terminal smaller*; whorls 6-4-flowered, more or less distant; calyx tubular, rough-papillose-hairy, striate, .007 long in flower, .01 in fruit; corolla pale violet, hardly twice as long as calyx — Spring — Dry fields and vineyards; common along coast and to middle mountain regions.

35. S. Horminum, L. ⊙ .2 to .5, villous, pale green; stems simple or sparingly branched from neck or above. Leaves petioled, cordate, rounded, or cuneate at base, oblong to ovate, .03 to .07 long, crenulate, the upper sessile. Floral leaves ovate-rhombic, about as long as calyx, furnished on either side with a subulate bract, the fertile green, *the terminal sterile, membranous, dilated, violet, tassel-like*; whorls 6-4-flowered, distant; calyx rough-papillose-hairy, striate, .007 long in flower, .01 and reflexed in fruit; corolla reddish-violet, about twice as long as calyx — Spring — Fields and hillsides; common to middle mountain zone. Probably a variety of the last.

Var. **angustifolia,** Boiss. Leaves oblong-linear to linear-spathulate — Sands near Tripoli.

36. S. Ægyptiaca, L. ♄ *Ra'al. Shajaret-el-Ghazâl.* .1 to .2, *canescent-puberulent*, intricately branched, branches stiff, almost spinescent. Leaves few, oblong-linear to linear, tapering to a short petiole, .01 to .02 long, .002 to .003 broad, the upper sessile, all bullate-crenate, revolute-margined, obtuse. Floral leaves minute, persistent, ovate, acute; whorls 2-4-flowered; calyx *pedicelled, nodding*, .003 long, oblong, pubescent to hirsute, the upper lip *shorter* with a concave, 2-grooved back, *and a somewhat incurved tip furnished with* 3, *minute, connivent*

teeth, teeth of lower lip triangular-lanceolate, subulate at tip ; corolla glabrous, scarcely once and a half as long as calyx — Spring — Sinai ; wadies about Dead Sea.

37. S. deserti, Dec. ♄ *Ghubeish, Shehîbî*, .1 to .15, *woolly-canescent ;* branches simple or sparingly branched. Leaves few, ovate to oblong, petioled, obtuse, .01 to .015 long, .002 to .003 broad, the upper sessile, all bullate-crenate, revolute-margined, obtuse. Floral leaves lenticular or elliptical; whorls 8-4-flowered; calyx *subsessile, hirsute-fleecy*, ovate, .002 long, lips about equal; corolla glabrous, scarcely once and a half as long as calyx — Spring — Sinai.

38. S. Judaica, Boiss. ♃ .6 to 1, papillose-hairy; stems stiffly panicled above. Leaves bullate-wrinkled, petioled, crenate or dentate-lobed; the radical *and sometimes the lower stem-leaves lyrate-pinnatipartite with ovate, obtuse leaflets*, the lateral 1-2 pairs, sometimes confluent, the terminal much larger, scarcely cordate; the cauline leaves sessile, cordate-ovate to oblong. Whorls 12-6-flowered, distant; pedicels shorter than calyx; calyx red, .007 long, scabrous, the upper lip a little the longer, with 3, triangular, mucronate, the lower with 2, subulate teeth; corolla violet, once and a half as long as calyx, with included tube — May and June — Coast and coast range to 800 m.

39. S. Russelii, Bth. ♃ .4 to .5, appressed-canescent, stems erect, slender, simple or stiff-panicled. Leaves rugulose, crenulate, the lower petioled with a cuneate or rounded base, *oblong-lanceolate, undivided*, or sometimes with a few minute lobules on the petiole, the upper sessile. Whorls 30-20-flowered, remote; pedicels rather shorter than calyx; calyx short-bilabiate, .004 long, all the teeth short-triangular, acute; corolla violet, twice as long as calyx — Spring — Ḥaurân; Aleppo; Aintâb, and northward.

12. ROSMARINUS, L. Rosemary. *Ḥaṣa-el-Bân.*

Calyx campanulate, bilabiate, upper lip concave, minutely 3-dentate, lower lip bifid, throat naked. Corolla-tube short-exserted, naked within, dilated at throat, upper lip erect, narrow, bifid, lower spreading, 3-lobed, the middle lobe largest, concave, pendulous. Fertile stamens 2, anterior, ascending under the upper lip, exserted, recurved, filaments continuous with connective, furnished below middle with a slender, short, reflexed tooth; anthers coherent in a linear cell fixed by its back to the tip of the connective. Style bifid. Nutlets ovate, smooth — Shrubs with blue flowers in axillary racemes.

R. officinalis, L. ♄ Rosemary. *Ḥaṣa-el-Bân.* 1 or more, branches erect, densely leafy. Leaves persistent, coriaceous, linear, .01 to .025 long, revolute-margined, olive-green at upper surface, canescent at lower. Flowers sessile, opposite, arranged in axillary racemes .02 to .03 long; bracts minute, oblong to ovate, caducous; calyx pubescent-canescent; corolla twice and a half as long as calyx — All the year — Hot hillsides above Shuweifât (Lebanon). Probably escaped from cultivation.

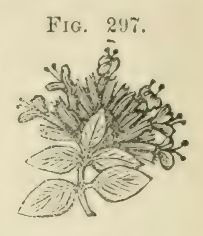
13. ZIZYPHORA, L. Zizyphora.

Calyx narrow-tubular, 13-nerved, obsoletely bilabiate, upper lip with 3, lower with 2, short, connivent teeth; throat villous. Corolla-tube not ringed, dilated at throat, upper limb erect, entire, lower

spreading, trifid. Perfect stamens 2, anterior, ascending beneath the upper lip; anthers connate by margins, 1-celled, either appendaged by a small, empty, stipitate cell, or not appendaged. Sterile filaments short, with 2, empty anther-cells or 0. Style bilobed. Nutlets smooth — Perennial or annual herbs.

* *Perennials, with aspect of Thymus Serpyllum.*

FIG. 297.



Head of Zizyphora clinopodoides, var. canescens.

1. Z. clinopodoides, M. B. ♄ ♃ .1 to .4, shrubby at base, much branched. Leaves glabrous to velvety or hairy, ovate to oblong and lanceolate, .005 to .01 long; floral similar in shape, somewhat smaller. Whorls crowded in a terminal, ovate-oblong to globular head; calyx minutely velvety or villous, .005 long; corolla white, once and a half as long as calyx, tube slightly exserted; anthers not appendaged — June to August —

Var. **canescens,** Boiss. .1 to .2, shrubby, branches intricate. Leaves elliptical to ovate-oblong or lenticular — Subalpine and alpine Lebanon and Antilebanon; Akher Dagh.

Var. **rigida,** Boiss. .3 to .4, branches slender, ascending. Leaves oblong to linear-oblong — Alpine Antilebanon.

* * *Annuals with aspect of Acinos.*

FIG. 298.



Head of Zizyphora capitata

2. Z. capitata, L. ⊙ .02 to .2, appressed-canescent, stemless or branching from base; branches erect, corymbose. Leaves lenticular to lanceolate and linear, acute, the floral *rhombic-ovate, more or less abruptly acuminate, arcuate-nerved,* forming an involucre longer than the heads. Heads *globular*; calyx cylindrical, .008 long, .001 in diameter, sparingly hispid; corolla pink, one-fourth longer than calyx, tube slightly exserted; anthers not appendaged — April to June — Coast; Palestine and Gilead to middle and upper Lebanon and Antilebanon; Aintâb; Marash.

3. Z. Hispanica, L. ⊙ Low, puberulent, branching from base, branches erect or ascending. Leaves short-petioled, *ovate,* acute, *arcuate-nerved;* floral similar in shape, longer than calyx. Whorls *few flowered, forming long, rather dense, leafy spikes;* pedicels short, thick; calyx cylindrical, pubescent or hirtulous; corolla once and a half as long as calyx, tube very slender, short-exserted; anthers not appendaged — Spring — Waste fields between Aleppo and Edlip.

4. Z. acutifolia, Montbr. et Auch. ⊙ .1 to .15, *puberulent,* branching from base. Leaves *lenticular to oblong-lanceolate,* short-petioled; floral *ovate to oblong,* acuminate. Whorls rather distant or contiguous, *forming long, rather loose or dense, oblong spikes;* calyx subsessile, puberulent; corolla with slender, slightly exserted tube; anthers not appendaged — Spring — Hills near Aleppo; Aintâb to Nisib.

5. Z. tenuior, L. ⊙ .05 to .2, canescent, branching from neck.

Leaves nerved, *scabrous, ciliate*, lenticular to lanceolate; *floral of same shape*, longer than flowers. *Whorls often arranged along the whole length of the branch*, forming more or less dense, oblong or *cylindrical* spikes; calyx subsessile, .009 long, .001 in diameter, hispid; corolla one third longer than calyx, tube slightly exserted; anther with or without *a club-shaped appendage*—April to June—Fields and hill sides; Damascus; middle and subalpine Antilebanon to Syrian Desert, Aintâb, Amanus, and northward.

6. Z. Taurica, M. B. ⊙ .02, canescent, branching from neck. Leaves linear-lanceolate, narrowed at base; floral similar, nerved, scabrous, ciliated, longer than calyces. Whorls axillary, loosely or densely spiked along nearly the whole branch; calyx subsessile, cylindrical, hispid; corolla *twice as long as calyx*, tube somewhat exserted, *expanded into a broad limb; anthers appendaged with an oblong, sterile, stipitate cell*, or not appendaged; sterile staminoids sometimes apparent — Spring — Between Aintâb and Urfa.

14. NEPETA, L. Catnip.

Calyx tubular, straight or incurved, with straight or oblique mouth, and in the latter case the upper teeth longer, less deeply cleft. Corolla tube destitute of ring, included or exserted, expanding at throat, the upper lip flat, straight, bifid, lower lip trilobed, middle lobe round, concave. Stamens 4, parallel, under the upper lip, curved forward, the lower shorter; anthers with 2, divergent cells. Nutlets smoth, wrinkled, or tubercled — (ours) Perennial herbs.

* *All the flowers perfect. Lips of corolla slightly unequal.*

† *Whorls dense, remote. Bracts ovate to oblong. Nutlets tubercled.*

1. N. leucostegia, Boiss. et Held. ♃ .3 to .5, appressed-canescent, with numerous, ascending, slender, simple or branching stems. Leaves petioled, cordate at base, ovate-oblong, .02 to .05 long, obtusely crenate. Whorls numerous, small, many-flowered, distant; bracts *white or pink-margined*, oblong-lanceolate, mucronate, scarcely longer than tomentellous calyx; calyx-teeth lanceolate, as long as tube; corolla pubescent, white, with somewhat exserted tube — Summer — above Zebedani; Suf Dagh; Aintâb. Probably only a broad-bracted variety of the following species.

† † *Whorls dense or loose, near or remote. Bracts lanceolate to linear-subulate. Nutlets tubercled or muricate.*

2. N. Orientalis, Mill. ♃ .3 to .5, canescent; stems erect, simple or sparingly branched. Leaves petioled, oblong-ovate to deltoid, .015 to .035 long, cordate to truncate at base, crenate, slightly wrinkled. Whorls distant below, *approximated above;* bracts numerous, oblong-lanceolate, *spiny-tipped*, about as long as calyx; calyx .006 long in flower, .009 in fruit, teeth lanceolate-subulate, spiny tipped, nearly as long as tube; corolla *cream-colored*, hardly twice as long as calyx, tube not exserted — May to August — Rocks; Lebanon; Cassius; Aintâb, and north-eastward.

3. N. septemcrenata, Ehr. ♃ .3 to .5, glandular-viscid and papillose-hairy; stems slender, simple, or 1-2-branched. Leaves pale green, ovate, .01 to .025 long, truncate or cordate at base, incised-cre-

nate-dentate, the lower petioled the upper sessile. Cymes few-flowered, the lower short-peduncled, the others sessile, forming loose, somewhat distant whorls; bracts lanceolate-subulate, as long as pedicels; calyx .005 long in flower, .008 in fruit, pruinose, slightly incurved, teeth one-fifth to one-fourth as long as tube; corolla slightly incurved, twice as long as calyx — Spring — Sinai to Egypt.

4. N. Trachonitica, Post. (Journ. Linn. Soc. Bot. Vol. XXIV. p. 439). ♃ .6 to .8, *puberulent, canescent;* stems stout, four-angled-ribbed, grooved. Lower leaves .03 to .05 long, .02 to .04 broad, long-petioled, ovate-cordate, obtusely *coarse-serrate*, the upper short-petioled, oblong-ovate, acutely coarse-serrate. *Spikes terminal, dense, oblong,* .03 to .05 long, .02 to .03 broad, scarcely interrupted at base; bracts appressed-woolly, linear-subulate, half as long as calyx; calyx .013 long, greenish-red, teeth half as long as tube; corolla *pink, woolly,* once and a half as long as calyx, tube slightly exserted; nutlets strongly tubercled — May — Ruins of Shuhbah (el-Leja).

5. N. Cilicica, Boiss. ♃ .3 to .6, *green, glabrous or minutely puberulent;* stems simple or branched. Lower leaves petioled, cordate-ovate, .015 to .05 long, coarse-toothed; upper sessile, acutely toothed. Whorls few-many-flowered, short-pedicelled to sessile, distant below, *approximated above;* bracts subulate, shorter than calyx-tube; calyx .01 long, teeth a third as long as tube; corolla blue, .03 long, with slender tube, twice to twice and a half as long as calyx; nutlets muricate — May to August — Moab; subalpine and alpine Lebanon and Antilebanon; Akher Dagh.

6. N. glomerata, Montb. et Auch. ♃ .3 to .6, *minutely glandular and papillose-pubescent;* stems ascending, branched. Lower leaves short-petioled, cordate-ovate, .01 to .025 long, obtusely crenate, the upper sessile, somewhat auricled. Whorls dense, small, sessile, all *remote;* bracts lanceolate-subulate, half as long as calyx; calyx .005 long, teeth a third as long as tube; corolla bluish, tube twice to twice and a half as long as calyx; nutlets tubercled — August and September — Alpine regions of Lebanon and Hermon; Akher Dagh.

7. N. Amani, Post. ♃ .3 to .6 or more, dark green, minutely puberulent; stems simple or sparingly branched above. Leaves petioled, cordate-ovate, .02 to .08 long, *incised-crenate-dentate;* the uppermost sessile, dentate. Cymes many-flowered, short-peduncled and -pedicelled, approximated, *forming a dense or somewhat interrupted spike* .05 to .1 long in flower, .1 to .2 in fruit; bracts subulate, shorter than calyx-tube; calyx .01 long, teeth one-fourth as long as tube; corolla blue, tube *about twice* as long as calyx — July — Amanus.

8. N. curviflora, Boiss. ♃ .6 to 1, *appressed-tomentellous,* canescent, panicled above. Leaves petioled, truncate to subcordate at base, oblong-ovate to oblong, .01 to .03 long, floral oblong-lanceolate, minute. Cymes many-flowered, short-peduncled and sessile, many times dichotomous, forming interrupted spikes or racemes; bracts subulate, curved, short; calyx .002 to .003 long, teeth oblong-ovate, *one-third to one-fourth as long as tube;* corolla blue, tube thrice as long as calyx, *strongly incurved* — April to June — Moab; Palestine to middle and subalpine Lebanon and Antilebanon and Cœlesyria.

9. N. nuda, L. ♃ .6 to 1, puberulent or glabrescent; stems

simple or stiff-panicled. Leaves green, oblong to oblong-lanceolate, cordate at base, crenate, obtuse, the lower short-petioled the upper sessile. Cymes short-peduncled and -pedicelled, forming an interrupted raceme or spike; bracts minute, subulate, *whitish;* calyx .004 long, striate, *teeth nearly as long as tube*, oblong-lanceolate, *whitish;* corolla pale violet, about twice as long as calyx, tube slightly exserted — Summer —

Var. **albiflora,** Boiss. Flowers white — Middle zone of Lebanon; Akher Dagh, and northward.

10. N. marrubioides, Boiss. et Held. ♃ .6 to 1, *velvety-canescent;* stems simple or panicled above. Leaves ovate to oblong-ovate, .02 to .05 long, cordate at base, crenate to dentate, the lower short-petioled, the upper sessile. Cymes dense, short-peduncled and -pedicelled, the lower subtended by floral leaves longer than they or as long; bracts hirsute, linear-setaceous, much shorter than calyx; calyx hirsute, .006 long, teeth narrowly lanceolate, *scarious-margined,* as long as tube; corolla white, *little longer than calyx,* tube included — May — Jebel Qulêb (Haurân).

* * *Flowers of two sorts, the first pistillate, the later staminate. Upper lip of corolla shorter.*

11. N. cryptantha, Boiss. et Haussk. ♃ .3 to .5, papillose-hispid; stems erect, pyramidal-paniculate above. Lower leaves short-petioled, ovate to oblong, .02 long, coarsely obtuse-toothed, the floral *sessile, lanceolate, acute, entire. Cymes dichotomous,* dense; bracts lanceolate, acuminate, *forming an involucre overtopping the flowers;* corolla .007 to .008 long, *cream-colored,* shorter than calyx-teeth — Spring — Ma'în; between Hadîdah and Hems; Hems, and eastward.

15. LALLEMANTIA, F. et M. Lallemantia.

Calyx tubular, with somewhat oblique mouth, the uppermost tooth broader, the lower two narrower. Upper lip of corolla concave, furnished with two arched folds within, nearly parallel with the margin, the lower lip spreading, trifid. Stamens 4, near together, under the upper lip, curved forward at tip, the lower shorter. Anthers 2-celled, cells diverging. Style with nearly equal divisions. Nutlets smooth — — Annual or biennial herbs.

1. L. Royleana, Wall. ⊙ .1 to .2, crisp-puberulent or pubescent, canescent; stem simple or branching from base. Root-leaves *long-petioled,* truncate or somewhat cuneate at base, ovate, blade .01 to .02 long, crenate; floral leaves subsessile, cuneate-oblong, few-toothed, longer than flowers. Whorls 4-6-flowered, forming an interrupted or continuous leafy spike; bracts petiolulate, cuneate-flabellate, with 2-3, aristate teeth on each side; calyx .008 long, with short, nearly muticous, at length involute teeth; corolla blue, tube included, limb minute — April — Between Qaryetein and Palmyra.

2. L. Iberica, M. B. ⊙ .2 to .4, glabrescent; stem simple or sparingly branched. Lower leaves *short-petioled,* ovate to oblong, .02 to .04 long, crenate to dentate; floral leaves sessile, oblong to linear-oblong and linear-lanceolate, denticulate, *twice as long as flowers.* Whorls 4-6-flowered, loosely spiked; bracts petiolulate, cuneate-flabellate, with 3-4, long-aristate teeth on each side; calyx .015 long, teeth

FIG. 299.



Whorl of Lallemantia Iberica.

mucronate, the uppermost obovate-spathulate, *all with conical gibbi at sinuses;* corolla blue rarely yellowish, tube included, limb small — April and May — Fields; between Jerusalem and Jericho; Damascus; Cœlesyria; Antilebanon; Aintâb.

3. L. canescens, L. ② .3, woolly-canescent; stems ascending from an indurated base, thick, simple. Lower leaves petioled, crenate, oblong-lanceolate; floral leaves sessile, *linear*, longer than flowers. Whorls 4-6-flowered, loosely spiked; bracts *small*, nearly sessile, cuneate-flabellate, with 2-3 aristate teeth on each side; calyx tomentellous, .015 long, teeth mucronate, the uppermost ovate-oblong; corolla *more than twice as long as calyx*, blue, the tube gradually expanded into a throat — Spring — Mountains of Northern Syria.

16. SCUTELLARIA, L. SKULL-CAP.

Calyx campanulate, bilabiate, lips entire, short, broad, closed in fruit, the upper furnished with a rounded, concave scale at back, deciduous. Corolla bilabiate, tube long-exserted. Stamens 4, near together, parallel under the upper lip, curved forward at tip, the anterior pair longer; anthers ciliate, those of upper stamens 2-celled, of lower 1-celled, the other cell being obsolete. Upper lobe of style shorter. Nutlets nearly globular, often tubercled — Herbs, often shrubby at base.

* *Flowers in a tetragonal spike or a loose not one-sided raceme.*

1. S. Orientalis, L. ♃ .1 to .4, branches numerous, indurated, ascending, short, pubescent to canescent. Leaves petioled, ovate to oblong, .01 to .02 long, *incised-dentate*, green and glabrous or pubescent above, appressed-canescent below. Flowers in an *oblong, tetragonal, dense spike;* floral leaves membranous, ovate or oblong-ovate, .006 to .008 long, entire, *hiding the calyces;* corolla yellow, sometimes with brownish lower lip — Summer.

Var. **genuina,** Boiss. Leaves larger, crenate-dentate — Amanus.

Var. **alpina,** Boiss. Stems prostrate, often rooting. Leaves more or less canescent. Spikes short, few-flowered — Alpine and subalpine regions.

Var. **pinnatifida,** Boiss. Leaves deeply pinnatifid, small — Alpine and subalpine regions.

2. S. fruticosa, Desf. ♃ .3 to .5, woolly and glandular-viscid, indurated at base, branches numerous, erect, or ascending, wand-like, simple or opposite-branched. Leaves oblong-lanceolate, .01 to .02 long, incised-crenate, truncate or cordate at base, canescent at lower greyish at upper surface; floral leaves herbaceous, ovate, .005 long, longer than calyx. Flowers *opposite, in interrupted, loose racemes;* corolla yellow, with lower lip often purplish — April to August — Dry hillsides; Jerusalem to Moab, Gilead, Haurân, Damascus, Hermon, Cœlesyria, Lebanon, Antilebanon, Aintâb, Akher Dagh, and northward.

Fig. 300.



Flowering branch of Scutellaria Orientalis, var. pinnatifida.

* * *Flowers in one-sided, leafy racemes.*

3. S. salviæfolia, Bth. ♃ .15 to .3; stems numerous, prostrate or ascending from an indurated base. Leaves grey-velvety, with glands interspersed, grooved at upper wrinkled at lower surface, petioled, cuneate or truncate at base, elliptical, blade .01 long; floral leaves oblong-elliptical, nearly entire, longer than calyces; corolla yellow, tube incurved at base — Summer — Amanus, and northward.

4. S. diffusa, Bth. ♃ .04 to .15, green, velvety with numerous glands; neck much branched, branches prostrate, short, rooting. Leaves petioled, ovate, .004 to .01 long, somewhat crenate, prominently nerved below. Racemes .04 to .1 long; floral leaves petioled, ovate, nearly entire, just longer than calyx; corolla hispid, *red,* .01 long — May and June — Amanus to Marash, and northward.

5. S. heterophylla, Mont. et Auch. ♃ .2 to .5, stems decumbent or ascending from a woody neck, simple or sparingly branched, puberulent. Leaves pale green, velvety-glandular, lineate at upper, wrinkled at lower surface, petioled, crenulate, the radical ovate, .006 to .01 long, the cauline *oblong to oblong-lanceolate and linear-lanceolate,* .02 to .04 long, .003 to .002 broad; the floral linear-lanceolate, about as long as calyces; corolla viscid-hispid, yellow — April to June — Bushy places; subalpine Lebanon, Cassius, Amanus, Kurd Dagh, Aintâb, and northward.

6. S. peregrina, L. ♃ .2 to .6 or 1, stems ascending or erect, nearly glabrous, paniculate. Leaves petioled, truncate or cordate at base, ovate, .01 to .04 long, coarse-toothed or crenate. Racemes .1 to .2 long, loose, *crisp-puberulent and somewhat beset with glandular hairs;* floral leaves ovate, acute or obtuse, longer than calyx. Corolla deep *violet,* pubescent, four times as long as calyx; seeds pitted, canescent with stellate hair — May to September —

Var. **Sibthorpii,** Boiss. More or less canescent or green with longer hairs intermixed with pubescence — Lower to alpine zones of Lebanon, Antilebanon, Cassius, Amanus, and interior plains.

7. S. utriculata, Labill. ♃ .1 to .2, *hispid-villous,* viscid, canescent; branches *decumbent, brittle,* from a woody stem. Leaves petioled, ovate, .01 to .02 long, truncate or cordate at base, crenate-dentate; floral leaves ovate, entire, short-petioled, somewhat longer than calyx. Racemes rather dense, at length loose; calyx inflated in fruit, .01 to .015 long and broad; corolla hispid, four times as long as calyx; nutlets .0015 long, *rough-tubercled* — May to September — Subalpine and alpine Lebanon and Antilebanon.

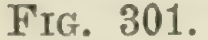

Fig. 301.



Fig. 301. (*a*) End of raceme of Scutellaria utriculata; (*b*) fruiting calyx; (*c*) lower leaf.

17. BRUNELLA, L. Self-Heal. Heal-All.

Calyx tubular-campanulate, netted-veined, flattened at upper surface, bilabiate, compressed and closed in fruit, the upper lip broad, truncate, short-tridentate, the lower bifid. Corolla-tube somewhat exserted, ringed within, limb bilabiate, the upper lip helmet-shaped, the lower dependent, obtusely trilobed. Stamens 4, near together, parallel under the upper lip, the upper bidentate, the lower tooth bearing an anther; anthers with two, divergent cells. Style bifid. Nutlets oblong, smooth — Perennial herbs with creeping root, and ovate-oblong spikes of flowers.

1. B. vulgaris, L. ♃ .3 to .4, glabrescent or pubescent; stems ascending. Leaves petioled, oblong to oblong-ovate, .02 to .08 long, entire, or dentate to pinnatifid. Bracts membranous, hirsute, orbicular, *abruptly acuminate;* teeth of upper lip of calyx short, *truncate,* mucronate, those of lower lip lanceolate; corolla violet, *short-*

Fig. 302.



Head of Brunella vulgaris.

exserted; longer filaments ending in a subulate mucro — Summer — Dry fields; common throughout.

2. B. grandiflora, Mœnch. ♃ .2 to .3, glabrescent or hirsute; stems ascending. Leaves petioled, ovate-oblong, .02 to .08 long, entire or rarely dentate to pinnatifid. Bracts membranous, orbicular, ciliate, *apiculate;* teeth of upper lip of calyx broad and *short-triangular*, mucronate, those of lower lip lanceolate; corolla violet, *twice as long as calyx, filaments muticous,* furnished with a small knob at apex — Summer — Between Ruweissât and Ṣofar (Lebanon). Too near the last.

18. SIDERITIS, L. Sideritis.

Calyx tubular-campanulate, sometimes somewhat 2-lipped, with five, usually spiny-tipped teeth. Corolla with included tube, and bilabiate limb, the upper lip erect, nearly flat, entire or retuse-bifid, the lower spreading, 3-cleft. Stamens didynamous, enclosed in tube, the upper very short, with divaricately 2-celled anthers, the lower longer, with often deformed anthers. Style included in tube, bifid, the upper lobe short, truncate, the lower dilated at base, surrounding the upper. Nutlets with rounded, obtuse tip — Annual or perennial herbs or shrubs.

* *Annuals. Floral leaves similar to the rest or nearly so, but smaller.*

1. S. Romana, L. ⊙ .1 to .35, soft-hairy, green; stems ascending or *diffuse.* Leaves *elliptical, obovate-oblong* and *ovate* to *oblong*, .03 to .01 long, crenate-dentate, the lower petioled. Whorls 6-4-flowered, distant; calyx-tube gibbous at base, .005 long, with spiny-aristate, lanceolate, acute teeth, *the uppermost much broader;* corolla white, with short-exserted limb — Spring — Fields; common along coast, and lower regions of coast range.

2. S. montana, L. ⊙ .1 to .25, soft-hairy, green, *erect* or ascending, branching from neck. Leaves *oblong-oblanceolate*, .035 to .01 long, *remotely denticulate* near apex. Whorls numerous, approximated; floral leaves oblong, spiny-mucronate, longer than calyx. Calyx-tube .005 long, teeth oblong, obtuse, reticulate, spiny-mucronate or aristate, the upper three connate higher up; corolla *yellow, turning brownish,* with short-exserted limb — Summer — Fields; Lebanon and Antilebanon to subalpine regions; Aintâb, and northward.

Var. **xanthostegia,** Post. (Journ. Linn. Soc. Bot. Vol. XXIV. p. 439). Stems and whorls villous. Calyx yellow, veined, teeth aristate. Terminal bracts sterile, yellow, forming a tassel .015 to .02 long.

3. S. Balansæ, Boiss. ⊙ .15 to .25, hirsute, viscid, pale green; stems simple or branching from base. Leaves oblong-lanceolate, subcrenate, rather obtuse, the floral narrower, as long as calyces. Whorls 6-4-flowered, more or less approximated; calyx .01 long, limb reticulate, *somewhat bilabiate, teeth nearly equal,* spiny-tipped, *the upper three connate higher than the lower two;* corolla *white or purple,* limb shorter than calyx — June — Qob-Elias (Cœlesyria).

* * *Perennial herbs or shrubs; whorls sessile with involucre of entire floral leaves.*

4. S. Taurica, M. B. ♃ .3 or more, many-stemmed, appressed-woolly, *canescent.* Leaves oblanceolate, the lower *crenulate*, obtuse,

spathulate, long-tapering at base, the upper sessile, acutish. Lower whorls distant, *the upper usually forming an almost continuous spike;* floral leaves membranous, reticulate, *green*, cordate, abruptly short-acuminate, *scarcely longer* than whorl; calyx-teeth lanceolate, two-thirds to half as long as tube; corolla *yellow*, with included tube — Summer — Rocks; Nahr-el-Kelb (Lebanon).

5. S. Libanotica, Labill. ♃ .4 to .6, many-stemmed, the branches and new leaves white-woolly, often glabrescent, greenish above; stems angled, slender, simple or stiff-branched. Leaves rigid, reticulate, spathulate and oblanceolate obtuse to oblong-lanceolate, the upper acute, mucronate, *usually acutely serrulate.* Whorls *distant*, about .01 long and broad; floral leaves somewhat membranous, cordate-orbicular, acuminate to abruptly cuspidate or mucronate, *the lower longer the upper shorter than whorl;* calyx-teeth spiny-mucronate, *half as long* as tube; corolla yellow, with included tube — July to September — Alpine and subalpine Lebanon, Antilebanon, and lower to alpine regions of Cassius, Amanus and Akher Dagh, and northward.

FIG. 303. FIG. 304.

Fig. 303. Whorls of Sideritis Libanotica.

Fig. 304. Spike of Sideritis Nusairiensis.

Var. **incana,** Boiss. Densely white-felty — Alpine regions.

Var. **linearis,** Bth. Green, glabrescent or canescent. Leaves *linear-lanceolate to linear* — Antilebanon; Aintâb, and northward.

6. S. Nusairiensis, Post. (Plantæ Postianæ, Fasc. V. p. 15). ♃ .6 to .8, *pannous*; stems simple, stiff. Leaves obovate-spathulate to spathulate and oblong, *entire*, rugose. Whorls approximated, *cup-shaped*, .008 *long and broad, forming an interrupted spike;* floral leaves *broader than long*, cordate at base, abruptly and *very short-pointed, all about half as long as whorls;* calyx-teeth *one-third to one-fourth* as long as tube, a little shorter than yellow corolla — July and August — Between Qal'at-el-Musyâf and El-Bîreh (Nusairy Mountains).

7. S. pullulans, Vent. ♃ .5 to .8, *grey-fleecy* below, *pubescent-viscid*, greenish above; stems stout, ending in an oppositely-branched panicle. Leaves reticulate, crenate-denticulate, spiny-tipped, oblanceolate to lanceolate-oblong. Whorls numerous, .01 to .02 long and broad, sometimes distant, *usually approximated;* floral leaves *strongly reticulated*, membranous, ciliate, puberulent, suborbicular, broader than long, cuspidate, *longer than whorls;* calyx-teeth shorter than tube, about as long as corolla — May to September — Dry places; coast, and hill country of Palestine, east and west of Jordan; Lebanon.

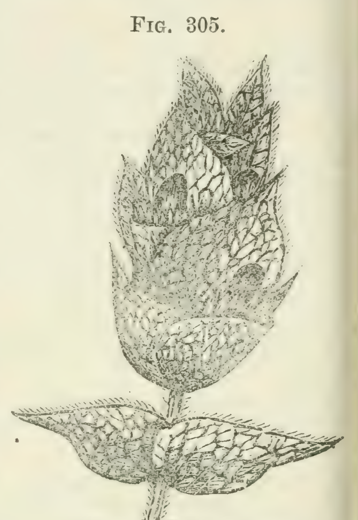
8. S. perfoliata, L. ♃ *Taranjân.* 1 or more, fleecy or more or less glabrescent, or viscid-hairy; stems *yellowish*, slender, simple or panicled, stiff. Leaves coriaceous, *yellowish*, the lower more or less pannous, tapering to a petiole, oblong-spathulate, the stem-leaves sessile, half-clasping, oblong to oblong-lanceolate, denticulate, acute to acuminate.

Whorls *usually distant*, often .05 to .1 apart, .02 to .01 broad, floral leaves .01 to .015 long, membranous, green, glabrous, netted, cordate at base, long-acuminate, *much longer than whorls;* calyx-teeth lanceolate, ciliate, half as long as sparingly glandular tube; corolla yellow, with enclosed tube — Summer — Dry hillsides; Jaulân to coast, middle Lebanon, Antilebanon, and northward.

Var. **Gadarensis,** Post. Stems and leaves *pannous with crisp, grey wool;* floral leaves *abruptly short-acuminate,* a *little* longer than flowers; upper whorls approximated — Below M'Kès (Jaulân).

9. S. glandulifera, Post. (Plant. Postian. Fasc. V. p. 16). ♃ .5 to 1, glandular-puberulent, with intermixture of long, white hairs; stems stiff, simple, or few-branched above. Leaves veined, those of the sterile clusters at base *fleecy*, oblong to obovate-spathulate, crenate, .02 to .04 long including petiole, .008 to .01 broad; stem-leaves *bright green, puberulent or glabrescent,* veined, sessile, cordate-clasping at base, oblong-lanceolate to oblong-ovate, .03 to .05 long, crenulate-denticulate, acute. Whorls closely approximated, .02 broad, *forming a spike* .1 or more long; floral leaves *bright green,* puberulent or glabrescent, cordate-ovate, long-acuminate at lower whorls, abruptly so at upper, in all *a little shorter* than calyces; calyx pubescent, teeth two-thirds as long as tube; corolla yellow, with enclosed tube — Summer — Amanus.

Fig. 305.



Spike of Sideritis glandulifera.

19. MARRUBIUM, L. Hore-hound.

Calyx tubular, 5-10-toothed, equal. Corolla-tube included or slightly exserted, limb bilabiate, the upper lip erect, retuse or bifid, the lower spreading, trifid. Stamens didynamous, straight, parallel, included, anthers divaricate; style bifid, with short, obtuse lobes. Nutlets obtuse — Perennial or annual herbs with wrinkled leaves.

* *Calyx-teeth five.*

† *Calyx-teeth a third to a fourth as long as tube.*

1. M. Libanoticum, Boiss. ♃ .2 to .4, more or less pannous below, woolly above, yellowish; branches procumbent at base, erect above. Leaves orbicular or obovate, .01 to .014 long, crenulate, petioled; the floral longer than whorl. Whorls dense; bracts subulate, shorter than .005 long, stellate-tomentellous calyx; calyx-teeth spiny-tipped; corolla flesh-colored, a little longer than calyx — June to October — Alpine regions of Lebanon and Hermon to Akher Dagh.

Var. **Hermonis,** Boiss. Stems *white-pannous* below. Corolla somewhat more exserted — Hermon; Amanus.

2. M. faucidens, Boiss. et Bal. ♃ .3, yellowish or white, densely *silky-pannous;* branches simple, procumbent at base, erect above. Leaves petioled, crenulate, obovate to oblong, cuneate at base, the floral subsessile, longer than whorls. Bracts subulate, plumose, somewhat shorter than calyx-tube; calyx *pannous*, .005 long, teeth subulate, spiny-tipped; corolla white, tube included — May to August — Alpine regions of Amanus and Akher Dagh, and northward.

† † *Calyx-teeth half as long as tube, at length stellate-spreading.*

3. M. Alysson, L. ⊙ *Frasîyûn.* Stems woolly, thick, ascending, low, simple or sparingly branched. Leaves grey, petioled, *cuneate-fan-shaped*, crenate-lobed toward tip, the floral smaller, deflexed, longer than whorls. Whorls 10-15-flowered, separate, *loosely spiked; bracts obsolete;* calyx appressed-fleecy, teeth spiny, at length stellate-spreading, throat at length closed by wool; corolla purplish, with minute limb — Spring — Waste places, borders of et-Tîh; Syria (Auch.).

* * *Calyx-teeth from* 10 *to* 15.

4. M. vulgare, L. ♃ .4 to .6; stems stout, white-woolly, ascending, simple or sparingly branched. Leaves crenate, soft-villous, greyish above, whitish below, *orbicular to ovate-orbicular*, .01 to .03 long, the lower petioled, often cordate. Whorls dense, globular, distant, rather shorter than cuneate-oblong, floral leaves; bracts subulate, hooked at apex; calyx-teeth 10, spreading, hooked at apex, *the alternate ones shorter*, the longest one third as long as .004 long tube; corolla white, with minute limb — April to September — Roadsides; common.

5. M. cuneatum, Russ. ♃ .4 to .6; stems ascending, simple or branching, white-woolly below, tomentellous, greyish or greenish above. Leaves petioled, *cuneate-obovate* to *oblong-cuneate*, .02 to .04 long, crenulate. Whorls less dense than in last, fewer-flowered, distant; floral leaves oblong, deflexed; bracts few, *short*, linear; calyx-teeth 10, or less, muticous, *unequal*, *the alternate generally trifid*, less than a third as long as .003 to .004 long tube; corolla-limb white, minute — March to August — Subalpine Lebanon and Antilebanon.

Var. **spinulosum,** Boiss. Calyx-teeth *longer*, *spiny-tipped.*

20. STACHYS, L. Hedge-Nettle.

Calyx tubular-campanulate, 5-10-nerved, with equal or oblique mouth, rarely somewhat 2-lipped. Corolla-tube cylindrical, equal, included, rarely short-exserted, with a transverse or oblique, hairy ring, or rarely naked within, the upper lip erect, entire or retuse or rarely 2-cleft, generally somewhat arched, the lower spreading, 3-lobed, the middle lobe the largest; stamens didynamous, exserted, the lower longer, with 2, divergent anther-cells; nutlets rounded, obtuse — Perennial or annual herbs, or shrubs.

* *Perennials.*

† *Whorls generally many-flowered; bracts from one-third as long as calyx to nearly as long.*

‡ *Corolla* .01 *to* .015 *long, yellowish, pink, or purple.*

1 S. glandulifera, 2 Libanotica, 3 Cretica, 4 Germanica, 5 pinetorum, 6 spectabilis, 7 Ehrenbergii.

‡ ‡ *Corolla .01 or less long, flesh-colored or pink, upper lip entire or retuse.*

8 S. viticina, 9 longespicata.

† † *Whorls usually few-flowered ; bracts very short or* 0.

‡ *Stems herbaceous, decumbent at base, ascending.*

10 S. hydrophila.

‡ ‡ *Stems erect, wandlike, stiff.*

11 S. Iberica, 12 distans, 13 bombycina, 14 diversifolia.

‡ ‡ ‡ *Shrubby at base ; the whole plant pannous, white or greyish.*

15 S. nivea, 16 affinis, 17 Palæstina.

‡ ‡ ‡ ‡ *Shrubby at base ; the flowering branches arising below the sterile rosette of leaves.*

18 S. pumila, 19 rupestris, 20 pubescens.

* * *Annuals.*

21 S. annua, 22 Arabica, 23 satureioides, 24 burgsdorffioides, 25 neurocalycina.

1. S. glandulifera, Post. (Plant. Postian. Fasc. IV. p. 11). ♃ 1 or more; stems simple, green with red angles, *glabrous.* Leaves .1 to .02 long, rugulose, crenulate, *soft-puberulent,* oblong, the lower petioled, *tapering at base,* obtuse at tip, the intermediate and upper sessile, acutish, the floral *shorter than whorls,* deflexed, spiny-mucronate. Whorls many-flowered, remote; bracts *linear-lanceolate,* spiny-tipped, *one-third to one-half* as long as calyces; calyx nearly sessile, *glandular-villous,* tube obconical, .01 long, truncate at base, teeth triangular, spiny-tipped; corolla villous, (drying cream-color), with *long-exserted* tube and entire upper lip — June — Kurd Dagh.

Fig. 306.



Terminal whorls of Stachys glandulifera.

2. S. Libanotica, Bth. ♃ .8 to 1.2; stems simple or stiff-panicled, often reddish, or red-angled, *setulose.* Leaves .1 to .02 long, wrinkled, crenate, *appressed-silky-villous,* the lower oblong, petioled, *round or somewhat truncate at base,* the floral *lanceolate,* acute, sessile, longer than whorls, the uppermost glabrescent. Whorls 6-15-flowered, remote; bracts *subulate, about as long* as calyces; calyx pedicelled, villous *at length coriaceous,* prominently veined and nerved, funnel-shaped, tube .01 long, teeth triangular, spiny-tipped; corolla hispid, pink, with *slightly exserted* tube and entire upper lip — Summer — Subalpine Lebanon and Antilebanon.

Var. **minor,** Boiss. Stems lower, simple. Calyx shorter, short-toothed — Wooded zone of Cassius.

Var. **eriocalycina,** Post. Calyx white-woolly. Teeth *triangu-*

lar-lanceolate — Wayside between Suweidah and 'Atîl (Haurân).

3. S. Cretica, S. et Sm. ♃ .6 to .8, appressed-woolly, canescent or pale green; stems erect, generally simple. Leaves slightly wrinkled, crenulate, obtuse, the lower oblong, petioled, .05 to .1 long, *tapering at base*, the floral sessile, oblong-triangular to lanceolate-oblong, longer than whorl. Whorls dense, many-flowered, separate; bracts oblong, half as long as calyx, spiny-mucronate; calyx densely woolly, somewhat oblique, tube .006 long, teeth triangular-lanceolate, spiny-tipped; corolla pink, with *included* tube, and retuse upper lip — Summer — Hills and stony places; Palestine to 1000 m., east and west of Jordan, to Lebanon, Amanus, Aintâb, Akher Dagh, and northward.

Var. **Garana,** Boiss. Whorls condensed, at least at tip of branches, into *oblong spikes*, interrupted at base — Amanus; Akher Dagh.

4. S. Germanica, L. ♃ .6 to 1, densely or sparingly woolly-villous; stems simple or sparingly branched. Leaves rugulose, crenate, the lower petioled, *ovate-cordate* to *oblong-cordate*, .1 to .03 long, the floral lanceolate, longer than flowers. Whorls many-flowered, the lower distant the upper approximated; calyx villous, .006 long in flower, .008 in fruit, somewhat oblique, with triangular-ovate, spiny-tipped teeth; corolla purple, with nearly included tube, and entire, hirsute, upper lip — June to September — Dry fields and woods; Alexandretta to Antioch, and northward.

Var. **spicata,** Post. Stems .3 to .4, simple, white-woolly. Leaves green above, canescent below, cordate-ovate. Whorls condensed into terminal spikes, .03 to .04 long — Amanus near Antioch.

Var. **Cassia,** Post. Appressed-hairy, canescent. Calyx-lobes *fleecy*, teeth longer and more spiny than in type — Wooded region of Mt. Cassius (*S. Cassia, Boiss.*).

5. S. pinetorum, Boiss. et Bal. ♃ .5 to 1 or more; stem tall, appressed-tomentellous, simple or sparingly branched above. Leaves membranous, scarcely wrinkled, ovate to ovate-oblong, cordate, short-petioled, greenish and pubescent at upper surface, white-woolly at lower; floral leaves oblong, *acuminate*. Whorls distant or approximated above; bracts *linear-subulate*, shorter than calyx; calyx somewhat oblique, greenish, *glandular-hairy*, teeth nearly equal, lanceolate, spinulose; corolla flesh-colored, the upper lip entire, *long-hirsute* — July to September — Amanus, and northward. Too near to next.

6. S. spectabilis, Choisy, ♃ .5 to 1; stem tomentellous-canescent, simple or branched. Leaves petioled, crenulate, the scallops often mucronate, ovate-cordate, acute, .06 to .15 long, not wrinkled, green to canescent at upper surface, pannous at lower; floral leaves denticulate or entire, oblong-lanceolate, acute. Whorls distant or the upper confluent; bracts *elliptical-rhomboid*, *cuspidate*, shorter than calyx; calyx *not oblique*, *densely woolly*, teeth lanceolate, spiny-tipped; corolla purple or flesh-colored, or variegated with cream-color, upper lip entire, hirsute — Late summer and autumn — Amanus to Marash, and northward. The above two species probably varieties of S. Germanica.

7. S. Ehrenbergii, Boiss. ♃ .5 to 1, stems hirsute, nearly simple. Leaves *soft*, *grey-woolly on both sides*, strongly wrinkled, crenulate, the lower petioled, *ovate-cordate*, .02 to .04 long, the floral oblong,

longer than flowers. All the whorls distant; bracts subulate, shorter than calyx; calyx densely woolly, somewhat oblique, .006 long in flower, .012 in fruit, with ovate, subulate-spiny teeth; corolla hirsute, pink, with retuse upper lip — June to September — Alpine and subalpine Lebanon.

8. S. viticina, Boiss. ♃ 1, appressed-tomentellous, canescent; stems erect, branching into a pyramidal panicle. Leaves crenulate, somewhat wrinkled, the lower oblong, .04 to .05 long, obtuse, short-petioled, truncate-subcordate at base, the floral sessile, small. Whorls small, numerous, woolly, *the lower generally distinct* the uppermost confluent; bracts oblong, somewhat shorter than calyx; calyx .004 long, teeth triangular-ovate, acute, *muticous* or spiny-mucronulate, half as long as tube; corolla pink, limb hirsute, upper lip *entire* — Summer — Coast, and to subalpine zone of coast ranges.

9. S. longespicata, Boiss. et Ky. ♃ .6 to 1, soft-tomentellous-canescent; stems erect, flexuous, much branched. Leaves denticulate, oblong, the lower petioled, cordate at base. Whorls, except a few lower, *crowded into a long spike;* bracts subulate; calyx scarcely .004 long, teeth lanceolate at base, *tapering into a long, spiny mucro, scarcely shorter than tube;* corolla pink, with hirsute limb, the upper lip *retuse* — Late summer — Cœlesyria; Amanus; Akher Dagh, and northward.

10. S. hydrophila, Boiss. *Ma'ṣûṣ barri. Kaff-ed-Dibb.* ♃ .6 to 1.5, hispid with soft, spreading hairs, green, branched. Leaves thin, membranous, petioled, coarsely crenate, cordate-ovate, the lower often .01 long; floral leaves somewhat *rhombic,* longer than whorls. Whorls 4-6-flowered, distinct, racemed; calyx green, viscid, campanulate, teeth triangular-lanceolate, spinulose, somewhat shorter than tube; corolla whitish-pink, lower lip broad — Spring — Coast to middle zone of Lebanon.

11. S. Iberica, M. B. ♃ .3 to .5, green, hirsute; stems simple or branched. Leaves oblong to oblong-linear, tapering at base, the lower short-petioled, obtusely dentate toward tip, the floral broad at base, oblong-lanceolate, acutish, muticous. Whorls 6-10-flowered, distinct; bracts nearly 0; calyx campanulate, teeth lanceolate, tapering into a long, weak, spiny tip, half as long as tube or longer; corolla purple, hirsute, with exserted tube; stamens scarcely exserted — Summer — Cassius, Amanus, and northward.

Var. **pallidiflora,** Boiss. Calyx hirsute or glabrescent; corolla flesh-colored or cream-colored to whitish.

12. S. distans, Bth. ♃ .3 to 1; white-woolly; stems slender, flexuous, ascending at base. Leaves .01 to .03 long, oblong-ovate, cordate or rounded at base, obtusely crenate-dentate, the lower petioled, obtuse, the upper sessile, acute, the floral oblong-lanceolate, scarcely as long as flowers. Whorls many-flowered, *distant,* or 2-3, crowded into an oblong head; bracts lanceolate, shorter than calyx; calyx .005 long, glandular-pubescent, teeth lanceolate, tapering to a spiny point, at length spreading, about as long as tube; corolla yellowish-white, glandular-hirtulous, tube slightly exserted, limb small — Summer — Coast to middle Lebanon.

Var. **oxyodonta,** Boiss. Leaves greenish, *more acutely dentate.*

Var. **teucriifolia,** Boiss. Glabrescent. Leaves smaller. Calyx-teeth shorter, *triangular.*

13. S. bombycina, Boiss. ♃ .3 to .5, *densely white-fleecy;* stems numerous, ascending, flexuous, simple or branching below. Leaves .01 to .015 long, ovate to oblong, obtuse, crenate-dentate, the lower petioled, the upper small, quite distant, entire, acutish, the floral shorter than calyx. Whorls 1-3, remote, many-flowered; bracts oblong, acuminate, shorter than calyx; calyx white-fleecy, teeth lanceolate-subulate, straight, as long as tube; corolla white, with small, hirtulous limb — Summer — Syria (Pestal.). Too near the last.

14. S. diversifolia, Boiss. ♃ .5, shrubby at base; annual stems herbaceous, slender, *glabrous,* simple or sparingly branched above. Leaves of sterile branches long-petioled, *sparingly appressed-setulose, green,* blade elliptical to oblong, .02 to .025 long, entire or obsoletely crenulate; leaves of fertile stems glabrous or sparingly setulose, sessile, linear to lanceolate-linear, obtuse or acute. Whorls 2-flowered, remote, the terminal often 3-4-flowered; floral leaves minute; bracts linear-setaceous, as long as calyx; calyx .003 to .005 long, viscidulous, teeth lanceolate, prickly, somewhat shorter than tube; corolla pale pink, hairy without — Summer — Cassius, and Amanus.

15. S. nivea, Labill. ♃ .3 to .4, appressed-pannous, white; branches thick, erect, simple or sparingly branched. Leaves subsessile to sessile, entire, prominently nerved, elliptical to oblong, .02 to .06 long, the lower tapering at base, obtuse, the upper rounded at base, acutish, the floral lanceolate, acutish, longer than whorls. Whorls numerous, 6-4-flowered, rather near, racemed; bracts minute or 0; calyx tubular-campanulate, .012 long, teeth triangular-lanceolate, one-third to one-fourth as long as tube; corolla white, pubescent, with included tube — April to July — Hillsides — Sinai (?); middle and subalpine Lebanon, Antilebanon, Damascus and Cœlesyria.

16. S. affinis, Fresen. ♃ *Gertum.* .2 to .6, grey-woolly, much branched; branches slender, flexuous. Leaves subpetioled, *narrowed at base,* oblong to oblong-linear, .01 to .035 long, obtuse, reticulate, *muticous.* Whorls 2-*flowered,* rather near, racemed; calyx .008 long, short-pedicelled, tubular-campanulate, teeth triangular, acute, *muticous,* one-third as long as tube; corolla pubescent, flesh-colored, with included tube — March to May — Sinai. Probably a variety of the following.

17. S. Palæstina, L. ♃ .2 to .6, grey-woolly, much branched; branches stiff. Leaves *sessile, clasping,* oblong to lanceolate, .01 to .04 long, obtuse to acutish, reticulate, the upper at least *mucronate ;* floral leaves ovate to rhombic, longer than calyces. Whorls 6-4, *rarely* 2-*flowered,* the lower distant, the upper crowded into spikelike racemes; bracts minute, setaceous; calyx tubular-campanulate, .006 to .008 long, teeth triangular-ovate, *mucronate,* one-third as long as tube ; corolla hirtulous, pink, with somewhat exserted tube — May to September — Coast; lower and middle to subalpine mountains and plains.

18. S. pumila, Russ. ♃ .1 to .15, *base shrubby, beset with stumps of petioles ;* sterile branches .03 to .05 long. Leaves of sterile branches crowded, long-petioled, appressed-tomentellous, canescent and strongly reticulate beneath, ovate-cordate, .02 to .05 long, crenulate. Flowering branches slender, .1 long, longer than sterile, with

3-5 whorls, and oblong, puberulent leaves, the floral longer than flowers. Whorls 6-10-flowered, distinct or confluent above; bracts minute, setaceous; calyx puberulent, .008 long, with lanceolate-subulate teeth *shorter than tube;* corolla yellow, with included tube — Summer — Cassius and Amanus to Antioch and Aleppo.

Var. **brachyodonta,** Boiss. Calyx-teeth half as long as tube — Antioch to Aintâb.

19. S. rupestris, Montb. et Auch. ♃ .2 to .3, woody at base; sterile branches .03 to .1 long. Leaves of sterile branches crowded, petioled, rugulose, crenate, ovate-cordate to oblong-cordate, .02 to .03 long. Flowering branches erect, .2 to .3 long, slender, simple or very sparingly branched, with 1-2, distant pairs of oblong, short-petioled leaves, and 2-5 whorls separate below or *crowded into an oblong head;* floral leaves ovate, about as long as calyces; whorls 6-10-flowered; bracts linear-setaceous; calyx .008 long, tubular-campanulate, teeth lanceolate-subulate, *almost as long as tube;* corolla yellow, with included or somewhat exserted tube — May to July — Alexandretta; Amanus to Aintâb, and northward.

20. S. pubescens, Ten. ♃ .3 to .6, pale green, pubescent, flowering branches ascending, mostly simple. Leaves crenulate, obtuse, the lower rounded or truncate at base, oblong, petioled, blade .02 to .04 long, floral sessile, elliptical, acutish, about as long as calyces. Whorls 6-flowered or less, the lower distant; calyx tubular-campanulate, .008 to .01 long, villous, teeth spiny, more than half as long as tube; corolla cream-colored, hairy, tube somewhat exserted — April to June — Marash, and northward.

21. S. annua, L. ⊙ .2 to .4, *rather glabrous below, pubescent above;* stem simple or branching from neck. Leaves petioled, crenate, truncate or cuneate at base, ovate-oblong, .01 to .03 long, the upper nearly sessile, oblong-lanceolate; the floral lanceolate to linear-lanceolate, acute or obtusish, entire, longer than calyx. Whorls 6-flowered, distinct, the upper approximated; calyx .008 long, hirsute-glandular, with lanceolate, tapering, somewhat spiny, upcurved teeth; corolla *cream-colored*, with slightly exserted tube — Spring — Coast.

Var. **ammophila,** Boiss. Branches short, often prostrate; calyx-teeth shorter, more hairy.

Var. **Cilicica,** Boiss. Lower leaves rounded at base — Common.

22. S. Arabica, Horn. ⊙ .5 to .8, *papillose-hirsute*, viscidulous; stems erect, thick, usually branching. Leaves crenate, the lower petioled, elliptical-oblong, .02 to .06 long, cordate at base, the upper sessile, oblong to oblong-lanceolate, serrate, rounded or clasping at base, the longest .04 long, the floral longer than whorls. Whorls 6-4-flowered, distant, racemed; calyx .012 long, with parallel nerves, *enlarging in fruit and tube becoming globular*, teeth triangular-oblong, spiny-tipped, *more than half as long as tube;* corolla *violet*, pubescent, with included tube and large limb — April and May — Coast, and lower zone of coast ranges; interior table-lands.

23. S. satureioides, Montb. et Auch. ⊙ .1 to .15, *pruinose or papillose-puberulent*, branching from base; stem and branches reddish. Leaves green, *entire or obsoletely* 1-2-*dentate*, .02 to .01 long, the lower

elliptical-oblong, tapering to a long petiole, the others oblong-linear to linear, sessile, acutish, the floral ciliate or hirtulous. Whorls 4-2-flowered; flowers sessile; calyx 5-*nerved*, teeth lanceolate-subulate, prickly-tipped, at length recurved, one-third as long as tube; corolla purple, tube short-exserted — June — Kurd Dagh; Aintâb, and eastward.

24. S. burgsdorffioides, Boiss. ⊙ .1 to .15, *pubescent-viscidulous*, green, branching from base. Leaves oblong to linear, .02 to .01 long, more or less *remotely denticulate.* Whorls about 4-flowered; flowers nearly sessile; calyx papillose-hirsute, 10-*nerved*, teeth lanceolate-subulate, spiny-tipped, one-third to one-half as long as tube; corolla purple, tube included — May — Aintâb, and northward. Very near the last.

25. S. neurocalycina, Boiss. ⊙ .2 to .5, *glabrescent*, branching from base, more or less diffuse. Leaves oblong to elliptical, .03 to .01 long, crenate-dentate, the lower long-petioled, the upper short-petioled or sessile. Whorls 4-5-flowered, distant; calyx sparingly papillose, 10-*nerved and reticulately veined*, *glossy*, *campanulate*, teeth *ovate*, *spiny-mucronate*, unequal, one-third to one-half as long as tube; corolla purple, tube included — Spring — Fields and dry places; coast, lower mountains of coast range.

21. WIEDEMANNIA, F. ET M. WIEDEMANNIA.

Calyx campanulate, bilabiate, the upper lip composed of one tooth broader and shorter than the four of the lower lip, the latter connate high up. Corolla-tube exserted, with a hairy ring within, limb bilabiate, the upper lip arched, the throat dilated, the lateral lobes appendaged or acutish, the middle lobe bifid. Stamens 4, parallel under the upper lip, anthers hispid, with two, divaricate cells. Style equally bifid. Nutlets acutely triquetrous, truncate at tip — Annual herbs, with purple flowers.

1. W. multifida, L. ⊙ .2 to .4, appressed-puberulent; stems simple or branching from base. Leaves obtusely crenate-dentate, the lower and intermediate petioled, ovate to ovate-oblong, .01 to .03 long, the upper sessile, incised to pinnatifid or -parted, the floral much longer than the whorls. Whorls hirsute, numerous, many-flowered, the lower distinct the upper approximated; bracts ovate to oblong-lanceolate, shorter than calyx; calyx .008 long; corolla .015 to .02 — May and June — North-eastern borders of Syria.

FIG. 307.

Whorl from middle of stem of Wiedemannia multifida.

2. W. Orientalis, F. et M. ⊙ .2 to .4, pubescent, viscidulous; stems simple or branching from base. Leaves ovate-oblong, the lower petioled, crenate, the upper sessile, obtusely coarse-dentate. Whorls many-flowered, distinct; bracts ovate, acuminate, shorter than

calyx; calyx .007 long in flower, .012 in fruit; corolla scarcely longer than calyx -- May and June -- Northern Syria, and northward. Probably only a variety of the last.

22. LAMIUM, L. Dead-Nettle.

Calyx tubular or campanulate, 5-toothed, with equal or oblique mouth Corolla-tube usually exserted, naked or hairy within, limb bilabiate, the upper lip arched or helmet-shaped, entire, retuse, or bifid; the throat dilated; the lateral lobes of the lower lip truncate or angled, sometimes appendaged, the median somewhat stipitate, notched or bilobed or entire. Stamens 4, parallel under the upper lip, anthers diverging. Style equally bifid. Nutlets acutely triquetrous, truncate at tip — Annual or perennial herbs.

* *Corolla-tube destitute of hairy ring within. Anthers hirsute.*

† *Perennials.*

1. L. striatum, S. et S. ♃ .2 to .3, *pubescent;* stems ascending, simple. Leaves cordate-ovate to triangular-ovate, .01 to .04 long, obtuse, crenate, the lower long-petioled, the upper short-petioled, longer than calyx. Whorls 6-8-flowered, the lower distant; calyx hairy, .008 long in flower, with lanceolate-subulate teeth, more than half as long as tube; corolla .025 to .035 long, pink, striped — April to September — Subalpine Lebanon and Antilebanon.

Var. **minus,** Boiss. Stems more decumbent. Whorls and flowers fewer. Calyx-teeth often short-subulate — Middle to subalpine and alpine Lebanon, Antilebanon, Amanus, and Akher Dagh; Gilead.

Var. **reniforme,** Boiss. Stems decumbent. Whorls few-flowered. Leaves glabrous, or puberulent, ovate-reniform, subcordate or truncate at base -- Antilebanon; Plain of Damascus; Cœlesyria.

2. L. veronicæfolium, Boiss. ♃ .03 to .05, *glabrous; stems from a long, corky, subterranean root-stock, brittle.* Leaves *all similar,* long-petioled, *round-reniform to cordate,* .004 to .01 broad, obtusely crenate, the floral longer than calyces. Whorl 1, terminal, 2-3-flowered; bracts linear-lanceolate, as long as calyx-tube; calyx .008 long, teeth triangular, one-third as long as tube; corolla pink, *purple-spotted,* hood hirsute, truncate, retuse, or obsoletely 3-4-denticulate — Summer — Alpine summits of Sunnîn and Makmal.

† † *Annuals. Leaves of two forms.*

3. L. amplexicaule, L. ⊙ (Fig. 276, *a*, *b*). .1 to .4, pubescent or puberulent, branching from neck. Leaves unequally crenate, the lower petioled, *round-ovate to ovate,* usually cordate at base, the floral sessile, reniform, clasping, lobed, longer than whorls. Whorls 1-4, separate; bracts 0; calyx *villous,* teeth lanceolate-subulate, somewhat shorter than tube; corolla about thrice as long as calyx, purple; akenes *smooth* — January to June — Fields; common to subalpine regions.

Var. **Aleppicum,** Boiss. (Supplem. Fl. Or. p. 362.). Leaves ovate to ovate-oblong; calyx-teeth more hirsute; seeds white-tubercled, mottled — Common with type.

4. L. Ehrenbergii, Boiss. et Reut. ⊙ .02 to .05, puberulent. Leaves minute, the lower ovate, *entire or crenulate;* the flo-

ral sessile, *cuneate, crenate-lobed at tip*, as long as whorls. Flowers in a *single, terminal, capitate whorl*, .01 broad; calyx pubescent, .004 long, teeth *ovate, mucronate, one-third as long as tube;* corolla twice as long as calyx; akenes *white-vermiculate* — Spring — Alpine Lebanon and Antilebanon. Perhaps a depauperated form of the preceding.

* * *Corolla-tube with a hairy ring within. Anthers hirsute.*

† *Perennials.*

5. **L. truncatum,** Boiss. ♃ .3 to .5, green, sparingly appressed-setulose; stems diffuse. Leaves tender, long-petioled, ovate-oblong to triangular-ovate, truncate-subcordate at base, coarsely and obtusely crenate-lobed, the floral more or less acuminate, much longer than whorls. Whorls 2-4, distinct, 6-8-flowered; bracts subulate, hirsute, very short; calyx appressed-setulose along nerves, .01 long in flower, .014 in fruit, with *lanceolate-subulate or setaceous teeth as long as tube* or longer; corolla pink, with tube nearly twice as long as calyx, and *setaceous, lateral lobes* — February to May — Coast and Lebanon to Amanus, and northward.

Var. **longedentatum,** Post. Calyx-teeth twice as long as tube — Marash.

† † *Annuals. Leaves all similar in shape.*

6. **L. moschatum,** Mill. ⊙ .3 to .6, green; stems ascending, glabrous, more or less branched. Leaves sparingly puberulent, petioled, cordate-ovate to ovate-triangular, truncate at base, crenate, the floral much longer than whorls, often with a white spot at base, somewhat acuminate. Whorls numerous, *many-flowered;* bracts lanceolate-subulate, ciliate, shorter than calyx-tube; calyx-tube .006 long in flower, .008 in fruit, nearly glabrous, with *triangular-subulate* teeth *about as long as* tube, at length stellate; corolla *white, with included tube, and triangular, lateral lobes* — January to May — Fields and moist places.

Var. **micranthum,** Boiss. Flowers smaller — Common.

7. **L. purpureum,** L. ⊙ .2, pubescent, branching from base. Leaves green, petioled, ovate-cordate, crenate or incised, the floral crowded, longer than whorls. Whorls slightly separated below, or crowded into a head; bracts subulate, shorter than calyx-tube; calyx .008 long, teeth lanceolate-subulate, longer than tube; corolla *purple*, tube *once-and-a-half as long as calyx*, lateral lobes somewhat bidentate — April to June — Fields; coast and lower mountains, and interior plains.

23. MOLLUCELLA, L. Molucella.

Calyx obliquely campanulate or bilabiate, limb broad, membranous, reticulate-veined. Corolla tube included, with an oblique, hairy ring within, the upper lip erect, the lower trilobed, the middle lobe broader, notched. Stamens ascending under the hood, the anthers attached by lateral pedicels to the tip of the filament, cells divergent. Style bifid. Nutlets acutely triqetrous, truncate — Annual herbs.

1. **M. lævis,** L. ⊙ .5 to .8, glabrous; stem simple or branching below, flower-bearing almost from base. Leaves long-petioled, rounded-subcordate, truncate, or cuneate at base, .02 to .04 in diameter, *nearly orbicular, obtusely coarse-dentate*, the floral as long as calyces or

or longer. Whorls 6-flowered, distinct, spiked; bracts subulate-spiny, shorter than calyx-tube; calyx-tube obconical, *limb broad, membranous, obsoletely pentagonal, 5-mucronate,* .03 *broad in fruit;* corolla white, shorter than calyx — June and July — Fields and roadsides; coast, mountains to subalpine regions, and interior plains; Jordan Valley.

2. M. spinosa, L. ⊙ .5 to 1 or more, glabrescent; stem stout, simple or sparingly branched below. Leaves petioled, round or round-ovate, .02 to .06 in diameter, truncate, cordate, or cuneate at base, *deeply incised-lobed and coarse-serrate,* the floral longer than whorls. Whorls 6-10-flowered; bracts subulate, spiny, shorter than calyx-tube; calyx-tube obconical, limb *coriaceous, bilabiate, oblique, the upper lip erect, lanceolate, spiny-tipped, the lower half-round-pentagonal,* beset *with* 7, *slender prickles, the alternate ones shorter;* corolla white, limb longer than calyx-tube — May to July — Coast and lower zone of Lebanon.

24. BALLOTA, L. Fetid Horehound.

Calyx funnel-shaped or obconical, with 10-nerved tube, generally grooved, and 5-19 teeth. Corolla-tube included or slightly exserted, hairy-ringed within, the upper lip erect, oblong, the lower spreading, 3-lobed, with middle lobe retuse. Stamens 4, ascending under galea, with exserted anthers approximated in pairs, and separate, diverging cells. Style bifid. Nutlets obtuse — Perennial herbs, sometimes shrubby at base.

* *Calyx-limb* 10-∞-*toothed or -crenate. Bracts not spiny.*

† *Calyx-limb membranous-expended, short crenate or dentate.*

1. B. Damascena, Boiss. ♃ *Asaghân.* .3 to .4, stems numerous, erect, flexuous, densely white, *appressed-cocoony.* Leaves few, orbicular, .01 to .015 broad, short petioled, grey-woolly, crisp, wrinkled, crenate. Whorls 2-3, *quite remote,* many-flowered, *as large as a small walnut;* bracts oblong-spathulate; calyx *white-woolly, limb* .005 *to* .007 *broad, with* 10-12, *spinulose, crenae at margin* — April to June — Salihîyah near Damascus.

2. B. undulata, Fresen. ♃ .3 to .6, stems numerous, *glandular and hirsute.* Leaves villous on both sides, orbicular, .015 to .03 broad, crisp, wrinkled, crenate. Whorls *numerous,* many-flowered, distinct; bracts linear-spathulate; calyx glandular-pubescent, limb .008 to .013 broad, *with undulate, muticous, obsoletely crenate margin* — April to June — Common from Lebanon, Antilebanon, Damascus and Haurân, southward to Et-Tîh and Sinai.

† † *Calyx-limb short, cleft nearly to base into* 10, *unequal teeth. Stems brittle.*

3. B. saxatilis, Sieb. ♃ .3 to .6; stems numerous, brittle, ascending, naked at base, hirtulous. Leaves *hirtulous,* canescent at lower, grey at upper face, petioled, wrinkled, crenulate, *cordate-ovate,* .01 to .04 long, the floral about as long as calyces. Whorls *few-flowered, loose,* flowers short-peduncled; bracts subulate, *one-third* as long as calyx; calyx-tube strongly ribbed and grooved, teeth triangular, spiny-mucronate, somewhat recurved, *one-fourth* as long as tube, the alternate ones smaller; corolla pale pink, with somewhat exserted tube, and *bifid* hood — Summer and autumn — Rocks; lower mountains to subalpine and alpine regions; common.

4. B. Antilibanotica, Post. (Plantæ Postianæ, Fasc. II. p. 20). ♃ .3 to .5, *appressed-puberulent with short, stellate wool, intermixed with longer, simple, branched, or stellate, glandular hairs;* shrubby at base; stems numerous, erect, leafy from base. Leaves *round-reniform,* .01 to .02 broad, strongly wrinkled, pannous, the floral becoming shorter than whorls. Whorls *dense,* numerous, forming an interrupted raceme or more or less dense spike; bracts linear, *as long as* calyx; calyx strongly ribbed and grooved, teeth triangular-ovate, spiny-mucronulate, recurved, *one-fifth* as long as tube, the alternate ones smaller; corolla pale pink, tube short-exserted, hood *quadrifid* — Summer — Valleys of northern Antilebanon to its alpine summits.

* * *Calyx-limb 5-toothed. Bracts not spiny.*

5. B. nigra, L. ♃ .5 to .8, hirsute or glabrescent. Leaves petioled, ovate, .02 to .05 long, coarse-dentate, all but the uppermost longer than whorls. Whorls commencing low down, distant, somewhat peduncled; bracts linear-subulate, one-half to two-thirds as long as calyx; calyx strongly ribbed and grooved, teeth straight, nearly equal, triangular, one-fifth as long as tube, tapering into a weak prickle; corolla pink, tube exserted — May to July — Roadsides; common.

25. OTOSTEGIA, Bth. Otostegia.

Calyx-tube cylindrical, 10-nerved, limb membranous, dilated, 2-lipped, the upper lip narrower and smaller. Corolla with included tube having a hairy ring within, hood erect, very hirsute, lower lip trifid, the middle lobe retuse. Stamens ascending, the anthers in pairs under the hood, with divergent cells. Style bifid. Nutlets obtuse — Shrubs, (ours) not spiny, others spiny owing to the persistent and growing bracts.

1. O. Schimperi, Bth. ♄ *Ghasseh.* .3 to .5; branches elongated, stiff, minutely velvety. Leaves densely woolly, short-petioled, ovate, .01 long, crenate, wrinkled at under surface, the floral shorter than whorls. Whorls 2-4-flowered; bracts few, subulate, short; calyx tomentellous, limb oblique, reticulated, obsoletely 10-*crenulate,* the lower limb .007 long, *twice* as long as upper, nearly as long as tube — Spring — Wadi Zuweirah and southward to Sinai.

2. O. moluccoides, Vahl. ♄ .3 to .5; branches herbaceous, hirtulous. Leaves rather long-petioled, short-cuneate or truncate at base, ovate, .01 to .04 long, hirtulous, canescent at under surface. Cymes axillary, few-flowered, somewhat peduncled; bracts setaceous, very short; calyx appressed-hairy, limb reticulate, lower lip broad, rhomboid-ovate, .01 long, obsoletely 5-7-*angled-dentate, the upper minute, ovate, entire, acute* — Spring — Sinai.

Fig. 308.



Whorl from middle of stem of Otostegia moluccoides.

26. LEUCAS, R. Br. Leucas.

Calyx tubular or campanulate, striate, straight or incurved at tip, mouth equal or oblique, 8-10-toothed. Corolla-tube included, hood erect, lower lip trifid, the middle lobe larger. Stamens ascending under hood, the anthers in pairs, nearly 2-celled; cells diverging, confluent. Upper lobe of style very short. Nutlets triquetrous, obtuse — Differs from Ballota by short upper lobe of style, and by shape of calyx.

L. inflata, Bth. ♄ Woolly-canescent. Lower leaves short-petioled, obovate-cuneate, obtuse, 3-4-toothed at tip; the floral sessile, cordate-orbicular, as long as flowers or longer. Whorls 6-10-flowered, numerous, distinct; bracts obsolete; calyx white-hirsute, *ovate-inflated*, with contracted mouth, and triangular-lanceolate, acuminate teeth — Between Suez and Gaza.

27. PHLOMIS, L. Jerusalem-Sage.

Calyx tubular, striate, often sulcate, with equal, truncate mouth, and acute, obtuse, or retuse teeth. Corolla-tube included, hairy ringed within, with compressed, arched hood, and spreading, trifid lower lip. Stamens ascending under hood, the upper filaments often spurred at base. Anthers in pairs, with divaricating, confluent cells. Nutlets 3-angled — Herbs or shrubs, generally woolly or fleecy.

* *Stems herbaceous, sometimes shrubby at base. Bracts* 0, *or few, not spiny.*

† *Leaves, or at least the radical, cordate. Corolla yellow.*

1 P. Nissolii, 2 Orientalis, 3 brevilabris, 4 cordata, 5 capitata.

† † *Leaves cuneate at base or tapering to a petiole. Corolla yellow.*

6 P. Armeniaca, 7 linearis.

* * *Shrubs. Bracts numerous, long. Corolla yellow.*

† *Bracts not spinescent, lanceolate to linear-subulate.*

8 P. aurea.

† † *Bracts leafy, ovate to cuneate-obovate, the inner cuspidate, more or less oblique.*

9 P. platystegia.

† † † *Bracts rigid, subulate, spinescent.*

10 P. parvifolia, 11 chrysophylla, 12 viscosa.

* * * *Stems herbaceous below. Bracts numerous, subulate, prickly-pointed. Flowers pink.*

13 P. Shepardi, 14 rigida, 15 Herba-Venti.

1. P. Nissolii, L. ♃ .5 to 1, densely flocculent-pannous, *panicled above.* Leaves ovate to ovate-oblong and oblong, the lower petioled, .1 to .2 long, the cauline oblong, cuneate at base, the floral a little longer than calyces. Whorls 6-4-flowered; calyx .012 long in flower, with *ovate-triangular teeth* .002 long; *longer filaments spurred at base* — May to August — Lebanon, Cœlesyria, Antilebanon, and the eastern tableland from Moab northward; Amanus; lower Jordan Valley.

Var. **leptorrachos,** Boiss. Indument less flocculent. Leaves often narrower.

2. P. Orientalis, Mill. ♃ .3 to .5, woolly, *somewhat flocculent;* stems simple or sparingly branched. Leaves often glabrescent above, wrinkled, the cauline ovate-oblong, petioled, cordate at base, .06 to .1 long, the floral ovate-oblong to oblong-lanceolate, truncate or cuneate at base, longer than whorls. Whorls 10-4-flowered; calyx .015 long in flower, teeth *lanceolate*, .004 long; longer filaments not spurred — Summer — Interior plains.

Var. **brachyodon,** Boiss. Calyx-teeth shorter, more obtuse — Wilderness of Judea.

3. P. brevilabris, Ehr. ♃ .25 to .4, appressed-woolly, *not flocculent*, often procumbent at base; stems simple or very sparingly branched. Leaves petioled, ovate to oblong-ovate, subcordate to cuneate or tapering at base, .02 to .04 long; the floral lenticular, longer than calyces. Whorls few-flowered; calyx .01 long in flower, teeth lanceolate, .002 long; longer filaments not spurred — Summer — Subalpine and alpine Lebanon, Cœlesyria, and Antilebanon.

4. P. cordata, Boiss. et Ky. ♃ .4 to .6, appressed-woolly, greyish yellow; stems ascending, nearly simple. *All the leaves cordate*, petioled, the lower .025 long, the upper smaller, as long as whorls. Whorls 4-6 flowered, distant; calyx .01 long in flower, teeth lanceolate, .003 long; longer filaments not spurred — Summer — Subalpine Amanus and Kurd Dagh.

5. P. capitata, Boiss. ♃ .2 to .3; stems numerous, erect, nearly simple. Leaves small, appressed-tomentellous, white or yellowish, wrinkled-netted, the radical cordate, the cauline subsessile, soon falling, the floral elliptical, as long as whorls. *Whorls crowded into an ovate, dense, terminal head*, the lowermost sometimes distinct; calyx .01 long in flower, teeth lanceolate, rather obtuse, .003 long — Summer — Akher Dagh.

6. P. Armeniaca, Willd. ♃ .5 to .8, appressed-woolly, canescent; stems simple, or sparingly branched. Leaves *elliptical to lanceolate and oblong*, .04 to .14 long, .01 to .025 broad, the lower long-petioled, the floral sessile, as long as whorls or longer. Whorls 2-4 or more, the lower distant, the upper approximated, 4-10-flowered, twice as large as a walnut; calyx .012 long in flower, teeth lanceolate, *one-third to one-half* as long as tube; nutlets glabrous — August — Akher Dagh.

7. P. linearis, Boiss. et Bal. ♃ .4 to .6; stems simple, sparingly woolly. Leaves *appressed-tomentellous*, *pale green*, *oblong-linear to linear*, .1 to .2 long, .005 to .01 broad, slightly wrinkled, the lower tapering into a long petiole, the floral sessile, *much longer* than flowers. Whorls 2-4, distant, 4-8-flowered, twice as large as a walnut; calyx .014 long in flower, teeth lanceolate, *one-half to two-thirds* as long as tube; nutlets hairy at tip — September — Beryt Dagh, and probably Akher Dagh.

8. P. aurea, Dec. ♃ .6 to 1, *golden-woolly*, flocculent. Leaves oblong, .05 to .1 long, .02 to .03 broad, the lower truncate or subcordate at base, short-petioled. Whorls many flowered, as large as a walnut or larger, distant; bracts oblong to linear, obtuse, somewhat shorter than calyces; calyx .015 long in flower, truncate, teeth 5, short-triangular-subulate; nutlets glabrous — Summer — Sinai.

9. P. platystegia, Post. (Plant. Postian. Fasc. VI., p. 15). ♄ .5 to 1, flocculent-woolly, stem glabrescent. Leaves crenate, wrinkled, oblong to ovate-oblong, .03 to .1 long, those of stem petioled, cuneate to rounded, subtruncate, or cordate at base, obtuse; floral leaves sessile, once to *thrice as long as whorls.* Whorls 3 or more, as large as a walnut or larger; bracts *oblong-ovate, to obovate-cuneate, pinnately nerved, at length glabrescent, the inner cuspidate, as long as calyces;* calyx .012 to .015 long in flower, golden-stellate-hairy, at length glabrescent in grooves, *truncate, the* 5 *more prominent ribs excurrent in spines* .002 long, the sinuses muticous; corolla yellow, once and two-thirds as long as calyx; nutlets glabrous, glossy — April and May — Valleys around Dead Sea.

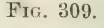


Fig. 309.



Inner bract and calyx of Phlomis platystegia.

10. P. parvifolia, Post. (Plant. Postian. Fasc. , p.). ♄ .5 to .6; new branches rusty-pannous. Leaves clustered at joints, very much wrinkled, short-petioled, truncate or sub-cordate at base, *oblong-elliptical*, .015 to .025 long, .006 to .008 broad, thick, pannous with stellate wool, *greenish at upper surface, rusty-canescent at lower*, crenulate, obtuse. Whorls 1-3, remote; flowers sessile, with 3-parted bracts, the divisions *linear*, stiff, pungent, appressed, as long as calyces; calyx .01 to .012 long in fruit, rusty-pannous, angled-grooved, truncate, ribs excurrent in spines .002 long; corolla * * * — Summer — Bitias; Amanus.

11. P. chrysophylla, Boiss. ♃ 1 or more, appressed-woolly, golden. Leaves reticulated, crenulate, petioled, cordate to ovate, .015 to .045 long. Whorl terminal, or 2, remote, the floral leaves as long as flowers or longer; flowers somewhat pedicelled, 3-bracted, bracts somewhat shorter than calyx; calyx golden-pannous, .01 long in flower, angled-grooved, truncate, teeth broad, short, the primary ribs ending in a *minute, prickly mucro;* corolla yellow, twice as long as calyx; nutlets glabrous — May to July — Subalpine Lebanon, Hermon, and Antilebanon.

Var. **oblongifolia,** Boiss. Leaves oblong, somewhat cuneate at base; whorls smaller, fewer-flowered — Amanus.

12. P. viscosa, Poir. ♄ .8 to 1.5, rather sparingly woolly, viscid above. Leaves .06 to .15 long, more or less crenate or serrate, ovate to oblong-lanceolate, canescent at lower surface, green or more or less canescent at upper, the lower petioled, cordate at base, the floral acuminate, *twice to three times as long as flowers.* Whorls 2-4, many-flowered, .03 to .2 apart; flowers *somewhat pedicelled*, bracts usually 3, about as long as calyx; calyx hispid, viscid, teeth *unequal, ovate acuminate, subulate at tip*, the longer pair about .004 long; galea bifid — May to August — Dry places; coast and mountains to 1000 m.

Var. **augustifolia,** Boiss. Leaves lanceolate, .015 to .02 broad at base. Whorls fewer. Calyx-teeth smaller — Lebanon; Beirût; Nusairy Mountains.

13. P. Shepardi, Post. (Plant. Postian. Fasc. , p.). ♃ .6 to .8; stem simple, *appressed-tomentellous, white.* Leaves wrinkled,

greenish, appressed-woolly, oblong to oblong-linear, the lower .1 or more long, .015 to .03 broad, obtuse, the upper more or less acute or acuminate, the floral longer than whorls. Whorls 4-5, many-flowered, *as large as a hen's egg*, the lower distant, the upper approximated; bracts and calyces *golden-fleecy*, the former three in number, curved upward, a little shorter than calyx; calyx .014 long, tubular-campanulate, teeth slightly unequal, the longest *nearly half as long as tube;* corolla drying cream-color, perhaps pink when fresh, twice as long as calyx — August and September — Kerhân, at foot of Akher Dagh; Beryt Dagh.

14. P. rigida, Labill. ♃ .5 to 1; stem simple, *long-hispid.* Leaves wrinkled, woolly, pale green, oblong to oblong-lanceolate, .3 to .08 long, .1 to .01 broad, the lower long-petioled, cordate at base, the floral nearly sessile, tapering at base, much longer than whorls. Whorls 3-5, *often as large as a duck's egg*, many-flowered, remote; bracts *long-hispid*, subulate, *as long as calyx;* calyx *hispid*, .015 to .02 long in flower, angled-grooved, teeth ovate-truncate at base, then subulate, half as long as tube; corolla twice as long as calyx — June and July — Subalpine and alpine Lebanon and Antilebanon to Aintâb, Akher Dagh, and northward.

15. P. Herba-Venti, L. ♃ .5 to 1; stems panicled, *stellate-puberulent or pruinose.* Leaves *olive green at upper, tomentellous-canescent at lower surface*, oblong-lanceolate, crenate or nearly entire, petioled, .15 to .03 long, the lower cordate, the upper tapering at base, the floral oblong-lenticular, twice as long as whorls or longer. Whorls 3-5 on each branch of the panicle, *smaller than a walnut*, remote; flowers subsessile; bracts subulate, somewhat longer than calyx, hispidulous; calyx hardly .01 long in flower, hirsute or woolly, teeth subulate, rigid, somewhat unequal, the longer about half as long as tube; corolla twice as long as calyx — Summer — Waste places; interior plains.

28. EREMOSTACHYS, Bunge. Eremostachys.

Calyx tubular-campanulate or funnel-shaped, the limb sometimes expanded, membranous, teeth 5, broad, spiny. Corolla-tube included, hood flattened, lower lip trifid. Stamens ascending under the hood, the upper filaments appendaged at base; anthers in pairs, with divergent, confluent cells. Nutlets hairy at apex — Perennial herbs, differing from Phlomis by aspect rather than botanical characters.

* *Calyx cylindrical or campanulate, limb straight, not expanded.*

1. E. laciniata, L. ♃ .6 to 1 or more, stem thick, ending in a dense, fleecy spike, .3 or more long, .06 to .08 broad, interrupted at base. Leaves green, hairy or somewhat fleecy, the radical ovate .3 to .4 long, .15 to .25 broad, petioled, bipinnatisect, segments oblong-lanceolate to linear, incised and dentate; cauline leaves smaller, the upper sessile; floral leaves ovate-oblong, incised, the upper shorter than flowers. Whorls numerous, many flowered; outer bracts linear-lanceolate; calyx fleecy, *truncate*, teeth *broad*, *short*, ending in very short, straight prickly points; corolla yellowish white or purplish — March to May — Common to subalpine regions, and interior plains.

Var. **tenuifolia,** Post. Root-leaves .15 to .2 long, .06 to .08 broad; lobules .005 to .01 long, crenate-dentate or incised — Plain of Gaza.

* * *Calyx funnel-shaped, with membranous-expanded, rotate limb.*

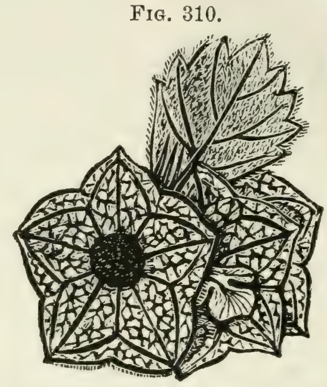


Fig. 310.

Whorl, with one of the opposite leaves of Eremostachys macrophylla.

2. E. macrophylla, Montb. et Auch. ♃ .3 to .5, more or less fleecy; stem thick, simple or opposite-branched from base. Root-leaves petioled, ovate to round, lamina .1 to .15 long, coarse-crenate, green or fleecy at upper surface, fleecy at lower, the floral sessile, cuneate at base, rounded above, serrate, as long as calyces or longer. Whorls 6-flowered, forming more or less dense spikes .2 to .35 long; bracts plumose, subulate-filiform, as long as calyx-tube; calyx-tube fleecy, *limb basin-shaped,* reticulate, *lobes half-round, broader than long,* short-mucronate; corolla yellow, scarcely longer than calyx — May and June — Fields and waste places; Kurd Dagh; Nebk to Qaryetein; Palmyrene Desert, and northward, and eastward.

29. PRASIUM, L. Prasium.

Calyx campanulate, 10-nerved, irregularly 2-lipped, the upper lip short-trifid, the lower deeply 2-parted. Corolla-tube included, with a scaly-hairy ring within, the lips of equal length, the upper ovate, entire, the lower trifid, the middle lobe larger, entire. Stamens ascending under the hood, the anther-cells divergent. Style equally bifid. Nutlets somewhat baccate — Shrubs.

P. majus, L. ♄ .5 to 1.5, glabrous or sparingly hispidulous above. Leaves ovate, .015 to .03 long, truncate or cordate at base, petioled, crenate or serrate, the floral narrower, less dentate. Whorls 2-flowered, more or less distant; calyx .012 long in flower, short-pedicelled, green, glabrous, with ovate, aristate teeth, the lower two longer than tube, the upper three irregularly connate; corolla white — Spring — Hedges and rocks; common on coast and mountains to 1000 m., east and west of Jordan, and northward.

30. TEUCRIUM, L. Germander.

Calyx tubular-campanulate or campanulate, with 5, equal or unequal teeth. Corolla deciduous, with short tube, not hairy ringed within, the upper lip short-cleft, the lower 5-lobed, the lowest lobe large, rounded or oblong, generally concave, the others small, oblong, (in ours) declined. Stamens 4, ascending, generally long-exserted, didynamous, with confluent anther-cells. Style nearly equally bifid. Nutlets reticulate or wrinkled — Shrubs or herbs.

* *Perennials. Peduncles opposite, axillary,* 1-3-*flowered, racemed or panicled. Calyx straight, equal-toothed.*

† *Leaves entire.*

1. T. rosmarinifolium.

† † *Leaves dentate or parted. Nutlets pruinose or hairy.*

‡ *Filaments exserted.*

2 T. multicaule, 3 Orientale, 4 pruinosum, 5 procerum.

‡ ‡ *Filaments nearly included.*

6. T. parviflorum.

* * *Perennials. Flowers sparingly or irregularly whorled, arranged in a simple spike. Calyx campanulate, bilabiate, with upper tooth broader.*

7 T. lamiifolium.

* * * *Perennials. Whorls 2-6-flowered, axillary, distant. Calyx oblique, somewhat gibbous at base, with nearly equal teeth.*

8 T. Scordium.

* * * * *Perennails. Flowers 2-3 in each cymule of the axillary, peduncled, 2-3-branched cymes. Calyx-teeth nearly equal.*

9 T. Auraniticum.

* * * * * *Annuals. Whorls 2-4-flowered, axillary, distant. Calyx gibbous at base, the lower 4 teeth spiny, the upper much broader.*

10 T. spinosum.

* * * * * * *Perennials. Whorls 2-flowered, in ovate-oblong spikes, or short racemes. Upper calyx-teeth 3, ovate to oblong, the lower 2 narrower.*

11 T. pæderotoides, 12 Montbretii.

* * * * * * * *Perennials. Whorls 2-6-flowered, in a loose raceme. Calyx subgibbous at base, with nearly equal, lanceolate teeth.*

13 T. Chamædrys, 14 flavum, 15 Socinianum, 16 coniortoides.

* * * * * * * * *Perennials. Whorls in globular to ovate-oblong terminal heads.*

17 T. leucocladum, 18 Polium, 19 Sinaicum.

1. T. rosmarinifolium, Lam. ♄ .5 to .8; branches stiff, canescent, with long internodes. Leaves green at upper surface, canescent at lower, revolute-margined, .01 to .03 long, the lowest *elliptical-linear, the others linear*, the floral shorter than flowers. Flowers opposite, forming loose spikes; pedicels hardly as long as calyx, the lowest sometimes 2-3-flowered; calyx campanulate, teeth triangular-lanceolate; corolla bluish-purple, about twice as long as calyx — May to September — Coast and mountains to 1500 m.

2. T. multicaule, Montbr. et Auch. ♄ .25, much branched, the newer parts hirtulous, pale green; branches erect, stiff, leafy, nearly simple, ending in a loose raceme. Leaves linear, *entire*, .015 to .03 long, *or tripartite to near middle into linear lobes*, usually with revolute margins, the lower floral longer, the upper shorter than flowers. Peduncles longer than calyx, or as long or shorter; calyx-lobes *twice as long as tube*, linear, tapering to a spiny tip; corolla blue, *nearly twice* as long as calyx — May and June — Aintâb to Marash, and northeastward.

Var. **planifolium,** Post. Leaves and lobes of same *oblong-linear*, not revolute-margined — Marash.

3. T. Orientale, L. ♃ .3 to .5, *hispidulous ;* stems erect, *greenish*, thyrsoid-paniculate above. Leaves *greenish* or canescent, 1-2-pinnatipartite into linear lobes with revolute margins. Peduncles 1-3-flowered; calyx-teeth lanceolate, *straight-tipped*, *a little longer* than tube; corolla three to four times as long as calyx — Summer —

Var. **nivale,** Boiss. Lower peduncles generally 1-flowered — Alpine and subalpine Lebanon and Antilebanon.

4. T. pruinosum, Boiss. ♃ .3 to .5, appressed canescent; stems thyrsoid or spreading-paniculate above. Leaves 1-2-pinnatipartite into linear lobes with revolute margins. Peduncles 1-3-flowered; calyx-teeth lanceolate, a little longer han tube, *slightly hooked ;* corolla about twice as long as calyx -- May to July — Dry fields; Cœlesyria, Antilebanon, Damascus and Haurân to Palmyrene Desert, Aintâb, and northward. Probably includes M. Taylori, Boiss.

5. T. procerum, Boiss et Bl. ♃ .5 to .8, *glabrous ;* stems quadrangled, ending in a long, pyramidal panicle. Leaves *glossy*, round, ovate in outline, 1-2-pinnatipartite into long, linear, revolute-margined lobes. Peduncles hirtulous, usually 1-flowered; calyx *short-campanulate*, teeth *triangular-lanceolate*, acute, *straight-tipped*, *hardly as long as* tube; corolla glandular-hirsute without, blue, about four times as long as calyx — Lower mountain zones to subalpine and alpine Lebanon, and interior plains.

6. T. parviflorum, Schreb. ♃ .3 to .5, *tomentellous*, greyish-canescent; stems quadrangled, branching from middle into a short-broad panicle. Leaves 2-3-ternately or pinnately parted into oblong-linear lobules with revolute margins. Peduncles 1-flowered, forked, longer than bract and calyx; calyx campanulate, teeth *lanceolate-subulate*, about as long as tube; corolla tomentellous without, blue, *once-and-a-half* as long as calyx -- May to August — Fields and waste places, interior plains; Syrian Desert.

7. T. lamiifolium, Urv. ♃ ⊙ .5 to .8, *villous*, grey; stems simple or sparingly branched. Leaves petioled, ovate to ovate-oblong, .02 to .06 long, cordate or truncate at base, crenate-dentate. *Spikes dense*, oblong, then cylindrical, .03 to .1 long; bracts subulate, plumose, longer than calyx; flowers horizontal, then deflexed; calyx bilabiate, *the uppermost lobe large*, *ovate*, *obtuse*, *apiculate*, *bent backward*, *membranous*, *reticulate ; the intermediate two small*, *ovate*, *obtuse*, *the lower two lanceolate-subulate ;* corolla white, scarcely longer than calyx; stamens included — May and June — Coast and lower zone of coast ranges.

8. T. Scordiun, L. ♃ .3 to .6, villous to fleecy, pale green to canescent, stems ascending, leafy. Leaves sessile, oblong-elliptical to ovate-oblong, .015 to .03 long, .008 to .014 broad, crenate to dentate, cordate to rounded at base, the floral longer than flowers. Flowers peduncled, 1-4 in the axils; calyx-teeth lanceolate, acute, about half as long as tube; corolla purlpish, twice as long as calyx — May to September — Moist places; common from coast to subalpine regions and interior plains. (Includes *T. scordioides*, *Schreb.*).

9. T. Auraniticum, Post. (Journ. Linn. Soc. Bot. XXIV, p. 440). ♃ .3 to .5, growing in clumps, shrubby at base, *papillose-puberulent*, pale green; stems flexuous, paniculate-branched from base. Leaves short-petioled, ovate-oblong, .015 to .025 long, .008 to .015 broad, rounded at base, obtuse, obsoletely crenate-dentate, the floral oblong-lenticular, entire, minute, shorter than *cymules.* Cymes long-peduncled; cymules pedicelled, bracts linear; calyx .003 long in flower, .006 long and *inflated in fruit*, strongly 20-ribbed, teeth *broad-triangular, obtuse, apiculate, one-fourth as long as tube;* corolla white, hairy, about twice as long as calyx; stamens included — May — Fields; Haurân. Forms a new section *Cymosum*, between *Scordium* and *Spinularia* (Fl. Or. IV. p. 814).

FIG. 311.



Teucrium Auraniticum.
(*a*) Flowering cymes. (*b*) Fruiting cyme.

10. T. spinosum, L. ⊙ Low, pubescent; stem erect, decussate-branched almost from base, forming a panicle with spinescent tips. Lower leaves soon dropping, petioled, oblong in outline, *pinnatipartite* into obtusely 2-3-fid lobes, the upper sessile, smaller, dentate, the uppermost minute, entire, ovate. Whorls remote, 2-4-flowered; *bracts changed to stiff spines longer than calyces;* pedicels as long as calyx; glandular-hispid, at length deflexed; upper calyx-tooth ovate, outwardly cancave, the lower 4 subulate; corolla white, scarcely twice as long as calyx; anthers scarcely exserted — Spring — Fields; Galilee, Aleppo, and northward.

11. T. pæderotoides, Boiss. et Haussk. ♃ Velvety-woolly, viscidulous, grey; neck woody, beset with persistent remains of branches; branches .05 to .07 long, erect, leafy, ending in an *ovate-oblong, dense spike* .015 to .02 long. Leaves subsessile, cuneate-oblong, .015 to .02 long, obsoletely crenate, prominently nerved at lower surface, obtuse, the upper acutish, forming an involucre to the spike. Bracts oblong-acuminate, longer than flowers; pedicels short; calyx .004 long, hispidulous, teeth rather more than half as long as tube, the upper three oblong, obtuse, the lower two lanceolate, acute; corolla *pink*, hairy, once-and-a-half as long as calyx — June — Fissures of rocks near Aintâb.

12. T. Montbretii, Bth. ♃ Velvety-woolly, *brittle;* branches numerous, flexuous, tangled, .04 to .25 long, ending in an ovate-oblong, dense spike. Leaves short-petioled, truncate at base, ovate to oblong, obtusely coarse-crenate. Bracts linear-lanceolate, acute, shorter than calyx; pedicels about as long as calyx, nodding; calyx campanulate, hispid, teeth about half as long as tube, the upper three ovate, obtuse, the lower two lanceolate, acute; corolla (dried) reddish, twice as long as calyx — June — Vertical rocks at base of Cassius to Antioch, Seleucia, Darkûsh and Edlip, and northward.

13. T. Chamædrys, L. Wall-Germander. ♃ .2 to .3, *green*, hirtulous to hirsute or canescent; root-stock stoloniferous, branches numerous, rooting at base, ascending, ending in a short, oblong, leafy raceme. Leaves oblong, .015 to .03 long, tapering to a bordered petiole, *incised-dentate or lobed;* the floral smaller, *toothed*, longer than calyx. Whorls 2-6-flowered; pedicels shorter than calyx; calyx reddish, pubescent, somewhat gibbous at base, .005 long, teeth lanceolate-subulate, rather shorter than tube; corolla purple, twice-and-a-half as long as calyx — June to September — Rocks; lower to subalpine mountains of northern Syria, and northward.

Var. **canum,** Boiss. Leaves woolly-canescent on both sides.

14. T. flavum, L. ♃ .2 to .4, shrubby at base, much branched; branches erect or ascending, crisp-hairy, *grey*, ending in a loose raceme .05 to .2 long; whorls distant at base. Leaves woolly, canescent at lower surface, obovate, cuneate-tapering at base into a short petiole, .01 long, *crenate above middle*, the floral oblong, smaller, *entire or obsoletely crenate near tip*, as long as calyces or shorter. Whorls 2-6-flowered; pedicels shorter than calyx; calyx grey or reddish, tomentellous, somewhat gibbous at base, .008 long, teeth triangular-lanceolate, rather shorter than tube; corolla yellow, twice as long as calyx — Summer —

Var. **purpureum,** Bth. Indument woolly. Corolla purple. Lower and middle zone of coast ranges, and northward (T. divaricatum, Sieb.)

15. T. Socinianum, Boiss. ♄ .15 to .2; stems numerous, intricate from a woody base, *very brittle*, tomentellous-canescent, ending in a glandular-hispidulous raceme, .03 to .06 long. Leaves sessile, *oblong to oblong-linear*, .006 to. 013 long, .003 to .004 broad, *revolute-margined, regularly crenate-lobed to base*, the floral *rhombic-ovate to oblong*, shorter than calyx. Whorls 2-*flowered ;* pedicels a little shorter than calyx; calyx viscid, .007 long, teeth triangular-lanceolate, about half as long as tube, nearly equal; corolla purple, twice as long as calyx — July — Fissures of rocks near Ma'lûlah and at Ras-el-'Ain (Yebrûd.)

16. T. coniortoides, Boiss. et Blanche ♄ .15 to .2; stems woolly-canescent, procumbent or ascending, ending in a loose raceme. Lower leaves .006 long, all woolly-canescent on both sides, *cuneate-oblong*, with somewhat revolute margin, and 2-3, *ascending, obtuse teeth on each edge*, the floral entire, about as long as flowers. Whorls 2-flowered, remote; pedicels a little shorter than calyx; calyx appressed-tomentellous, teeth lanceolate, nearly equal, about half as long as tube; corolla purple, twice as long as calyx — May — Base of el-Jebel-el-Abiad (Palmyrene Desert).

17. T. leucocladum, Boiss. ♄ *Ja'ádeh* .2, appressed-woolly-canescent; the old branches woody, tortuous, the new white, .04 to .07 long, forked, *at length subspinescent.* Leaves *cuneate-obovate*, the largest .009 long .006 broad at tip, obtusely and sparingly crenate, the floral elliptical, entire. Heads *scarcely larger than a pea*, nearly spherical, few-flowered, short-peduncled; bracts elliptical, obtuse; calyx .0025 long, teeth *ovate, obtuse;* corolla white, once-and-a-half as long as calyx — Rocks; Wadi Ḥebrân (Sinai).

18. T. Polium, L. ♃ *Bu'eiterân* .2 to .4, tomentellous-canescent, or white-fleecy, shrubby at base; branches ascending or erect,

panicled or corymbose. Leaves sessile, oblong to linear, .01 to .03 long, flat or revolute-margined, obtuse, crenate. Heads dense, spherical to ovate, short-peduncled; bracts linear-spathulate, shorter than flowers; calyx .004 long, tubular-campanulate, teeth ovate, acute or obtuse, nearly equal, about half as long as tube; corolla little longer than calyx; anthers scarcely exserted — Summer —

Var. **vulgare,** Boiss. Leaves oblong, flat or revolute-margined; heads .01 to .015 in diameter. Corolla *white* — Common from coast to alpine regions, even in deserts.

Var. **angustifolium,** Bth. Leaves linear-cylindrical, strongly revolute-margined — Palestine, Cœlesyria, Amanus, Aleppo, Aintâb, and northward.

Var. **roseum,** Boiss. Flowers pink.

Var. **littorale,** Post. Low. Leaves oblong, thick, .005 to .01 long, crowded. Heads *dense*, spherical to oblong — Sands of coast.

Var. **spicatum,** Post. Heads ovate-oblong, .01 to .02 long, .008 to .012 broad — Amanus; Aintâb; Mountains south of Qaryetein.

19 T. Sinaicum, Boiss. *Ja'adah.* ♄ .2 to .4, *viscid, grey-hirsute; trunks woody below*, .003 thick; branches erect, *simple or sparingly branched.* Leaves sessile, oblong to linear, convolute-margined, obtusely crenate or crenate-lobed. Heads terminal, globular, .01 in diameter, dense, solitary or 2-3 in a cluster; floral leaves shorter than flowers; bracts linear, plumose; calyx glandular-punctate and hirsute, upper 3 teeth triangular-ovate, lower 2 longer and narrower; corolla white, once-and-a-half as long as calyx; anthers short-exserted — Summer — Rocks; Sinai.

31. AJUGA, L. Ajuga.

Calyx campanulate or obconical, 5-fid or dentate. Corolla marcescent, tube included or exserted, often hairy-ringed within, straight or spirally twisted; limb bilabiate, the upper lip short, retuse, rarely bipartite, the lower elongated, spreading, trifid, the lateral lobes small, oblong, the intermediate broad, often bilobed. Stamens 4, ascending, usually exserted, didynamous; anther-cells divergent, at length confluent. Style bifid. Nutlets pitted or wrinkled — Herbs or shrubs.

* *Whorls many-flowered.*

1. A. Orientalis, L. ♃ .3 to .5 or more, destitute of stolons, villous-woolly. Root- and lower stem-leaves persistent, *oblong*, .1 to .15 long, tapering to a long petiole, obtusely sinuate and incised-lobed. Whorls numerous, the lower distant, the upper approximated; floral leaves sessile, oblong or round, 3-5-serrate-lobed, longer than flowers; calyx fleecy, teeth longer than tube; corolla blue, tube short-exserted — April to June — Rich fields and woods; coast to subalpine regions, and interior table-lands.

* * *Whorls 2-4-flowered. Upper lip of corolla not cleft.*

2. A. Iva, ♃ .2 to .3, *canescent or villous*, branching from base; branches prostrate or ascending, leafy. Leaves *all alike, oblong-linear to linear*, .02 to .03 long, .003 to .005 broad, *revolute-margined, remotely*

1-3-*toothed on both sides or entire.* Whorls 2-4-flowered, *much shorter than floral leaves,* forming a dense raceme; calyx fleecy, teeth lanceolate, obtuse, shorter than tube; corolla purplish-pink or yellow, *thrice* as long as calyx — Spring — Dry fields; coast of southern Palestine; Highlands of Moab (Paine).

3. A. Chia, Poir. ♃ .1 to .35, hispid to glabrescent; root-stock woody, branches prostrate or ascending. Leaves crowded, those of root oblong-spathulate to linear-spathulate, .05 to .1 long, tapering into a long petiole, repand-sinuate; stem-leaves .01 to .025 long, *trifid or -parted into oblong to linear,* entire or dentate lobes, *the floral shorter than flowers.* Whorls 2-flowered, forming long, leafy, dense racemes; calyx-teeth lanceolate, acute, shorter than tube; corolla yellow, sometimes streaked with purple, or purple, twice-and-a-half as long as calyx — Spring — Waste places and fields; common from coast to middle mountain zones and interior.

Var. **suffruticens,** Boiss. ♄ More canescent and shrubby; branches shorter; calyx-teeth shorter; lobes of leaves shorter — Jerusalem; Damascus; Aleppo; alpine regions of Lebanon and Hermon.

Var. **tridactylites,** Boiss. Branches tender; leaves membranous, cuneate-oblong, trifid into ovate-oblong, short lobes — Common.

4. A. vestita, Boiss. ♄ .05 to .15, *fleecy-canescent;* root-stock woody; stems flowering from base, forming *an oblong spike,* at length .1 or more long. Root-leaves petioled, rhombic-ovate, obtusely 3-4-crenate; cauline sessile, cuneate to obovate, cleft often to middle into 3, oblong to ovate, obtuse lobes. Calyx fleecy, lobes lanceolate, rather longer than tube; corolla white or yellow, twice-and-a-half as long as calyx — Summer — Fissures of rocks, south of Qaryetein.

5. A. lævigata, Russ. ⊙ .1 to .3, *glabrous, green,* branching from base; branches simple or corymbose above. Root-leaves linear-spathulate, tapering to a long petiole, entire or few-toothed; stem-leaves trifid or 3-parted into linear, entire lobes; the *floral* leaves *as long as flowers.* Whorls 2-flowered, forming dense, leafy racemes; calyx-lobes lanceolate, sometimes hairy, about as long as tube; corolla yellow, purple-streaked below, *five times* as long as calyx — May and June — Fields and rocky places; Amanus to Aleppo, Aintâb, and northward.

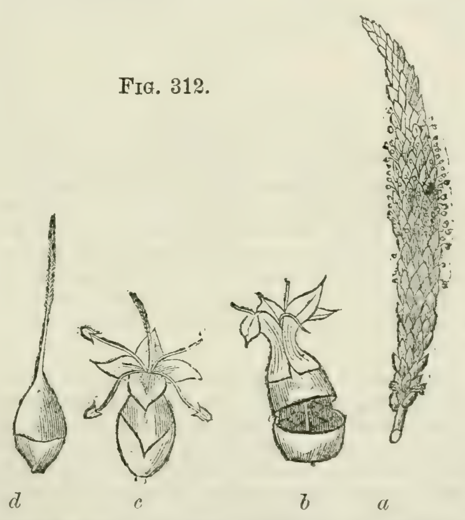
* * * *Whorls 2-flowered. Upper lip of corolla 2-parted.*

6. A. Postii, Briq. (Bulletin. Herb. Boiss. II. .710). ♃ 1 or more; stems erect, glabrous or sparingly papillose at angles, more or less diffusely branched. Leaves short-petioled, *oblong-lanceolate,* .1 or more long, green, rounded to cuneate at base, coarse-serrate to entire, more or less acuminate, ciliated at margin, sparingly papillose at under surface. Flowers axillary, solitary; pedicels short, glabrescent, *curved over the petioles after flowering;* calyx campanulate-urceolate, tube 5-nerved, teeth ciliated, linear-subulate, thrice as long as tube; corolla marcescent, twice as long as calyx, upper lip oblong, notched at tip, lateral lobes of lower lip round-ovate, middle lobe obovate, much longer; nutlets with *fleshy pericarp* — Early summer — Amanus; 1200 to 1600 metres.

ORDER LXXX. **PLANTAGINEÆ.** (PLANTAIN FAMILY.)

Herbs, sometimes with shrubby base, and regular, 4-merous, spiked flowers (rarely diœcious), the calyx persistent, and corolla scarious, fugacious; the 4 stamens inserted on the tube of the corolla, alternate with its lobes, the filaments filiform, flaccid, induplicate in the bud, the anthers 2-celled, versatile; the ovary free, 1-4-celled, 1-8-ovuled; the style filiform, erect, stigmatose on two lines along its length — The ovules peltate, inserted on central placentæ, adnate to septa, or in 1-ovuled cells by a basilar placenta. Fruit a capsule or nutlet. Seeds with horny albumen. Embryo straight, in the centre of the albumen.

FIG. 312.



(*a*) Spike of Plantago major. (*b*) Capsule, opening by a lid, which is crowned by the fugacious corolla. (*c*) A complete flower, with calyx, 4-lobed corolla, 4 stamens alternating with its lobes, and style rising between. (*d*) Capsule and style.

PLANTAGO, L. PLANTAIN. *Duweinat-el-Jidi.*

Flowers spiked or capitate, each sessile, subtended by a bract. Calyx-lobes similar or unequal, the anterior pair sometimes united. Corolla tubular, limb at length reflexed. Capsule a membranous pyxis, with a free, 2-4-winged placenta, which divides it into 2-4 false cells — Herbs or shrubby plants with alternate or opposite leaves.

* *Stemless plants with leaves all radical, or caulescent with alternate leaves.*

† *Capsule with two,* 4-8-*seeded cells. Seeds angled. Perennials.*

1 P. major.

† † *Capsule* 3-*celled, cells* 1-*seeded, or rarely* 1-*celled,* 1-2-*seeded. Inner face of seed grooved or boat-shaped.*

‡ *Corolla glabrous.*

§ *Perennials or perennants.*

2 P. lanceolata, 3 albicans, 4 cylindrica.

§ § *Annuals.*

5 P. amplexicaulis, 6 Lœflingii, 7 Cretica, 8 ovata, 9 Haussknechtii, 10 phæopis, 11 notata.

‡ *Corolla-tube glabrous, lobes hirsute. Annuals.*

12 P. Lagopus, 13 ciliata.

† † † *Capsule 2-celled, cells sometimes bilocellate. Corolla-tube hairy, lobes glabrous. Flowers appressed to axis.*

14 P. Coronopus, 15 maritima, 16 carinata.

* * *Stem leafy, leaves opposite. Corolla glabrous, the tube wrinkled transversely.*

† *Perennials.*

17 P. Arabica.

† † *Annuals.*

18 P. Psyllium, 19 stricta, 20 phæostoma, 21 arenaria, 22 squarrosa.

1. P. major, L. *Mesâseh. Waraq-Şabûn. Lisân-el-Kelb. Lisân-el-Hamal.* ♃ Stemless. Leaves petioled, *ovate to ovate-oblong*, 3-7 nerved, .1 to .2 or more long, entire or irregularly repand, glabrous or sparingly puberulent. Scapes ascending, as long as leaf or longer; spike linear-cylindrical, .1 to .25 long; bracts ovate, cancave, keeled, scarious-margined, as long as calyx; calyx-lobes equal, ovate, obtuse; corolla-lobes ovate, rather obtuse; capsule ovate — Spring and summer — Moist places; common.

2. P. lanceolata, L. ♃ Stemless, glabrescent or hairy. Leaves oblong-lanceolate to lanceolate, .05 to .25 or more long, acute, tapering to a petiole, 3-5-nerved. Scapes *angled*, much longer than leaves. Spikes ovate-oblong to cylindrical, .02 to .06 long; bracts ovate, acute or acuminate, glabrous; anterior lobes of calyx *glabrous*, usually united into one, two-nerved, the posterior usually hairy along keel; corolla-lobes ovate, acuminate; capsule oblong — Spring and summer — Fields and pastures; common, even to alpine regions.

Var. **genuina,** Boiss. Scapes and leaves elongated, the leaves glabrous or hairy, lanceolate, petioled.

Var. **altissima,** Boiss. Usually glabrous; scapes .5 to .6 long; leaves broader.

Var. **capitata,** Presl. Spikes globular to ovate, then oblong.

3. P. albicans, L. ♃ Root-stock woody, branching. Leaves and scapes *silky-fleecy, silvery.* Leaves rosetted at tip of branches of root-stock, linear-spathulate to lanceolate-spathulate, acuminate, tapering to a long petiole, 3-nerved, flat or wavy. Scapes *terete*, .15 to .3 long, much longer than leaves; spikes cylindrical, .02 to .06 long, sometimes interrupted at base; flowers *twice as long as in last;* bracts cancave with a *broad, herbaceous, glabrous or velvety strip along the middle of the outer surface, and broad, scarious, villous-ciliate margin and tip;* calyx-lobes

ovate, bearded at tip, herbaceous along midrib, otherwise scarious; corolla lobes ovate-oblong, short-acuminate — Spring — Sandy places; coast, and interior plains, and deserts.

4. P. cylindrica, Forsk. *Umm Lubbeideh. Barkhemy.* ⊙ ♃ Stemless or short-stemmed, *silvery-fleecy.* Leaves linear to linear-oblong, and oblong-lanceolate, tapering to a petiole, acutish with a callous tip, entire, *nerves concealed by fleece.* Scapes terete *shorter than leaves,* spikes often subsessile, oblong to cylindrical, .02 to .08 long; flowers as large as in last; bracts ovate, obtuse, with a herbaceous, hirsute strip along middle of outer surface, and scarious, villous-ciliate margin; calyx-lobes oblong-obtuse, herbaceous along midrib, otherwise scarious, ciliate at margin and tip; corolla-lobes ovate-lanceolate, acute — Spring — Sands; Sinai and et-Tîh to Egypt.

FIG. 313.

b a

(*a*) Spike of Plantago cylindrica, before flowering. (*b*) Lower half of spike during flowering.

5. P. amplexicaulis, Cav. ⊙ *Khanânet-en-Na'jeh.* More or less hairy, stemless or stems .05 to .15. Leaves lanceolate to linear-lanceolate, 5-nerved, *entire,* tapering to a *clasping* petiole. Peduncles axillary, longer or shorter than leaves; Spikes .01 to .02 long, globular to ovate and cylindrical; bracts glabrous, ovate-orbicular, hooded, obtuse, midrib green, margin and tip scarious; calyx glabrous, lobes round-ovate, *the anterior with a green keel,* the posterior all scarious; corolla-lobes ovate-oblong, acute — Spring — Et-Tîh, and southward to Lower Egypt.

6. P. Lœflingii, L. ⊙ Pubescent, stemless. Leaves linear to linear-lanceolate, entire or *remotely denticulate,* acuminate. Scapes a little longer than leaves; spikes .01 to .015 long, ovate to oblong; bracts *transversely ovate,* glabrous or ciliate at margin, midrib *broad,* herbaceous, *excurrent in a broad, obtuse point,* scarious-margined; calyx lobes *all scarious,* ovate-orbicular, glabrous; corolla-lobes ovate-lanceolate, acute — Spring — Sandy places; Jebel Usdum; Jericho; Aleppo and north-eastward.

7. P. Cretica, L. ⊙ Villous; stemless. Leaves linear-lanceolate to linear-spathulate, acutish, tapering at base, rarely somewhat dentate. Peduncles thick, fleecy, *much shorter than leaves,* at length *indurated, recurved;* spike round-ovate, .008 long; bracts *oblong-lanceolate, herbaceous, fleecy,* longer than calyx; calyx-lobes ovate, not keeled, *fleecy toward tip,* the outer somewhat herbaceous, the inner scarious; corolla-lobes ovate, *short-cuspidate* — Spring — Sandy and dry places; common from coast to middle mountain zone and interior plains.

FIG. 314.



Spike of Plantago ovata.

8. P. ovata, Forsk. ⊙ *Jeneimeh. Kibâsh. Luqmet-en-Na'jeh.* Villous-fleecy, stemless. Leaves narrow-linear to lanceolate, entire or obsoletely callous-toothed, tapering at base. Scapes as long as leaves or

shorter; spikes globular to ovate and oblong, .008 to .03 long; bracts round-ovate, glabrous, obtuse, midrib herbaceous, extending to tip, margin scarious; calyx-lobes ovate, obtuse, scarious, glabrous or pubescent; corolla-lobes ovate or round, mucronulate — Spring — Sandy places; coast and deserts.

9. P. Haussknechtii, Vatke. ⊙ Hirsute-canescent, stemless. Leaves entire, linear-oblong to linear, entire, somewhat 3-nerved, tapering at base. Scapes slender, somewhat striate, rather longer than leaves, .04 to .08 long; spikes oblong to oblong-cylindrical; bracts *ovate-orbicular*, obtuse, *fleecy at back*, with a herbaceous excurrent midrib, and broad, scarious margin; calyx-lobes *hirsute toward tip;* corolla-lobes *ovate, acute* — Spring — Moab and Gilead, and eastward.

10. P. phæopis, Paine. (Third Statement, Palestine Exploration Society, p. 120). ⊙ Pubescent, stemless. Leaves entire, or once forwardly incised on each margin near the tip, 3- or obscurely many-nerved, becoming glabrescent. Scapes as long as leaves, slender, .05 to .1 long; spikes ovate to short-cylindrical, .008 to .015 long; bracts orbicular, *densely fleecy*, scarious, with a herbaceous, obtusely excurrent midrib; calyx-lobes orbicular, scarious, *glabrous;* corolla-lobes *orbicular-obovate*, obtuse, *yellowish-red toward base* — April and May — Moab; Ḥaurân. Readily distinguished from P. Hausknechtii by its glabrous calyx-lobes, and from P. ovata by its fleecy bracts. Hardly distinguishable from sparingly laciniated, narrow-leaved forms of P. notata, Lag.

11. P. notata, Lag. ⊙ More or less hirsute, stemless, pale green. Leaves sessile, lanceolate to linear, 3-5-nerved, almost entire or *furnished on either side with distant, linear, acuminate lobes and lobules, usually with a tuft of hairs at base.* Scapes declined, hardly as long as leaves; spikes ovate to cylindrical, .01 to .03 long; bracts ovate-orbicular, fleecy at back, herbaceous at midrib, otherwise scarious, as long as calyx; calyx fleecy at base, lobes glabrescent, *altogether scarious*, ovate, obtuse; corolla-lobes *buff-colored, ovate-orbicular*, mucronulate or muticous — February to May — Sandy places; Philistine Plain.

12. P. Lagopus, L. ⊙ *Widnah.* Stemless, neck hirsute. Leaves glabrescent to hirsute, lanceolate to oblanceolate, tapering to a petiole, 3-5-nerved, often .2 long, entire or obsoletely denticulate. Scapes angled-sulcate, 1-4-times as long as leaves; spikes ovate to cylindrical, .015 to .07 long, dense; bracts ovate-lanceolate, acuminate, scarious except at green midrib, villous above; calyx-lobes villous at tip, the lateral keeled; corolla-lobes ovate, acute or acuminate, more or less hairy along nerve — March to July — Grassy places; coast, mountains to 1000 m., and interior plains; Jordan Valley.

13. P. ciliata, Desf. ⊙ Silky-canescent, stemless or caulescent. Leaves obovate or oblanceolate-spathulate, acutish, tapering to a petiole. Peduncles thickish, as long as leaves or shorter; spikes ovate to oblong, .008 to .02 long; bracts ovate, obtuse, green and hirtulous along midrib, margin broad, scarious, *long-ciliate*; calyx-lobes ovate, scarious, long-ciliate at margin; corolla-lobes *lanceolate, long-villous* at outer surface — Spring — Sands; Et-Tîh to Sinai and Egypt.

14. P. Coronopus, L. ⊙ ② More or less appressed-hirsute, stemless. Leaves *oblong-lanceolate to linear-lanceolate*, pinnate-dentate or 1-2-pinnatifid into lanceolate to linear, acute lobules. Scapes longer

than leaves; spikes cylindrical, dense, .03 to .15 long; bracts appressed-hirtulous, narrow-margined, ovate, acute or acuminate; calyx-lobes ciliate, the posterior keeled-winged; corolla-tube hirsute, lobes ovate-lanceolate, acuminate; *cells of capsule bilocellate* — Spring — Sands and dry places; common.

Var. **simplex**. Leaves linear, entire or few toothed — Beirût among pines.

15. P. maritima, L. ♃ Stemless. Leaves *fleshy, linear*, 3-nerved, *entire or remotely denticulate*, glabrous or sparingly papillose, hirsute or fleecy at sheathing base. Scapes appressed-papillose-hairy, usually longer than leaves; spike cylindrical, .02 to .06 long, rather loose; bracts ovate, concave, shorter than calyx, narrow-margined; calyx-lobes obtuse, broad-margined, the keel of the posterior lobes green, expanded into a narrow, scarious wing; corolla-tube appressed-hirtulous, lobes ovate, acute; *cells of capsule* 2, *each with* 1 *seed* — Summer — Salt marshes; coast and interior.

16. P. carinata, Schrad. ♃ *Root-stock woody*, with many stems. Leaves triquetrous-linear, glabrescent or fleecy at base. Scapes appressed-hirtulous, usually much longer than leaves; spikes ovate-globular to cylindrical, .01 to .05 long; bracts ovate-lanceolate, acute, as long as calyx; calyx-lobes scarious-margined, the posterior keeled; corolla-tube appressed-hirtulous, lobes ovate, acute; capsule 2-celled with 1 seed in each cell — July to October — Subalpine and Alpine Lebanon and Anti-lebanon.

17. P. Arabica, ♄ L. .2, *shrubby at base and above, the branches naked below*, densely leafy. Leaves hispid, *very viscid*, stiff, *linear-triquetrous*, .015 to .02 long, revolute-margined. Peduncles few together, corymbed in the upper axils, longer than leaves; spikes ovate-spherical, .008 long, few-flowered; bracts ovate, acute or acuminate, viscid-hirtulous, somewhat shorter than calyx; calyx viscid-hirtulous, anterior lobes oblong, obtuse, posterior keeled; corolla-lobes ovate-lanceolate, acute — March — Elevated valleys and mountain tops of Sinai.

18. P. Psyllium, L. ⊙ *Qaṭunah*. .2 to .4, *glandular-pubescent;* stem erect, simple or thyrsoid-branched. Leaves linear-lanceolate to linear, .03 to .06 long, entire or remotely denticulate. Peduncles from upper axils, about as long as leaves; spikes ovate-spherical, .006 to .013 long, glandular-hairy; bracts ovate-lanceolate, acute or acuminate; calyx-lobes acuminate, corolla-lobes lanceolate, acute — Spring — Grassy places and fields; common even in deserts.

19. P. stricta, Schousb. ⊙ .2 to .4, *minutely pruinose above, papillose-hairy at joints;* stem nearly simple. Leaves linear, entire. Peduncles from upper axils, often longer than leaves; spikes *ovate*, long, *scabridulous-hairy;* bracts lanceolate to lanceolate-linear; calyx-lobes acutish; corolla-lobes lanceolate, acute — Spring — Near Aleppo at 'Ain-el-Beiḍa.

20. P. phæostoma, Boiss. et Held. ⊙ .04 to .07, glandular-puberulent and papillose-hairy, branching from neck, branches divaricate. Leaves linear, .01 to .025 long, entire. Peduncles as long as leaves and heads, or shorter; spikes oblong, .014 to .02 long, dense, hirtulous; bracts *oblong-linear*, obtuse, all but the lowest shorter than calyx; calyx-

lobes oblong, obtusish, alike; corolla-lobes ovate, mucronate, with a buff-colored throat — Spring — Sands; Wadi-Zuweirah and southward to Sinai and Egypt.

21. P. arenaria, W. K. ☉ .3 to .5, pubescent; stem erect or diffuse, stiff branched. Leaves linear to *filiform*, .03 to .06 long, .001 to .002 broad, entire, margin somewhat revolute, base often villulose. Peduncles axillary, longer than leaves, more or less umbelled; spikes ovate, .01 long, dense; bracts papillose-hirtulous at back, *the lowest ovate, tapering into a herbaceous cusp longer than flowers, the upper spathulate-orbicular, membranous-margined;* anterior calyx-lobes *obliquely ovate, obtuse*, posterior lanceolate, acutish, membranous; corolla-lobes ovate-lanceolate, acute — Spring — Sands in valleys about the Dead Sea, and southward to Egypt.

Var. **divaricata,** Boiss. Branches forked. Leaves shorter and broader — A maritime form.

22. P. squarrosa, Murr. ☉ .2 to .3, papillose-hairy, branching from neck; stems diffused or ascending, usually branching. Leaves somewhat fleshy, linear to *linear-oblong*, .02 to .04 long, .003 to .005 broad, often recurved. Peduncles axillary, as long as leaves or shorter; 3-5 together; spikes pubescent, oblong to cylindrical, .01 to .02 long; *the lower pair of bracts forming an involucre to the spike, sometimes elongated, oblong-lanceolate, recurved, somewhat narrowed above the dilated base;* the upper oblong, obtusish, as long as calyx or longer; anterior calyx-lobes oblong-spathulate, somewhat oblique, posterior oblong, keeled; corolla-lobes ovate-oblong, acute — Spring—Sands along coast.

Var. **brachystachys,** Boiss. Spikes globular or flattened-hemispherical; lower bracts shorter and thicker.

DIVISION V. MONOCHLAMYDEÆ, D. C. APETALOUS PLANTS.

Floral envelopes usually in one row, resembling either a calyx or a corolla. Some genera or species of these orders have both calyx and corolla.

ORDER LXXXI. NYCTAGINEÆ, LINDL. (FOUR-O-CLOCK FAMILY.)

Herbs or shrubs, (ours) with opposite leaves, stems tumid at the joints, a campanulate, tubular, or funnel-form calyx resembling a corolla, its persistent tube constricted above the 1-*celled*, 1-*seeded ovary and nut-like fruit; the stamens (in ours)* 1-3, *hypogynous; the embryo (in ours) conduplicate, enclosing the mealy albumen* — Flowers (in ours) hermaphrodite. Stamens inserted on a cup-like disk, usually connate at base. Ovary free, short-stipitate; style simple, radicle inferior — Herbs with shrubby base.

BŒRHAAVIA, L. BŒRHAAVIA.

Flowers destitute of involucre, hermaphrodite. Perigonium campanulate or funnel-shaped, the limb 5-lobed, marcescent, usually deciduous with the upper part of tube. Anthers somewhat exserted, 2-celled.

Ovary acute; style filiform, stigma obtuse. Fruit cylindrical-obconical — Herbs with shrubby base.

1. B. plumbaginea, Cav. ♃ *Duweinat-el-Fár.* 1 or more; stems herbaceous, forked below. Leaves subcordate, round, cuneate or truncate at base, ovate, .02 to .05 long, entire or sinuate, the lower obtuse, the upper acute. Peduncles axillary, longer than leaves, bearing a terminal umbel, and often 1-2, sessile whorls; pedicels minutely glandular, as long as ovary or shorter, or a little longer; perigonium funnel-shaped, .01 long, limb .005 broad, white, hairy, thrice as long as ovary; fruit club-shaped, .008 long, .002 in diameter, beset with scattered, hemispherical, glabrous tubercles -- Spring and summer.

Var. **glabrata,** Boiss. Green, glabrous or puberulent — Coast; Plain of Esdraelon and Nazareth; Jordan Valley and Dead Sea, and southward to Sinai

Var. **viscosa,** Boiss. Viscid-pubescent, pale green — Sinai.

2. B. verticillata, Poir. ♃ 1 or more, glabrous-glaucescent; stems *white*, terete, much branched, forked. Leaves cordate-ovate, often .05 long and broad, obtusely repand-sinuate. Peduncles axillary, bearing 1-3, 3-5-flowered, rather distant whorls; pedicels capillary, longer than flower; perigoniun .003 to .004 long, *abruptly expanded into a campanulate-limb; fruit* .004 *long, appressed-setulose,* striate, club-shaped, beset below with scattered, and toward tip with crowded, glabrous, hemispherical tubercles — Spring — Ghor-eṣ-Ṣafieh, El-Arabah and southward.

3. B. repens, L. ♃ Stems numerous from neck, diffuse, forked, herbaceous. Leaves ovate to *oblong and linear-lanceolate,* obtuse, sinuate-repand. Peduncles axillary, capillary, *forming a leafy panicle of* 3-5-*flowered, head-like umbels;* perigonium .0015 to .002 long, *nearly sessile, short-campanulate;* fruit oblong-club-shaped, .003 long, 5-ribbed and sulcate, glandular — Spring — Ghor-es-Safieh and Jericho.

ORDER LXXXII. AMARANTACEÆ. (AMARANTH FAMILY).

Weedy herbs or shrubs, with exstipulate leaves, and 2-3-*bracted, spiked or clustered flowers, with a* 3-5-*parted perigonium, imbricated in the bud, stamens (in ours) as many as the lobes of the perigonium, inserted opposite to them, a free,* 1-*celled, and (in ours)* 1-*seeded ovary, forming a membranous utricle with* 1, *crustaceous seed, or a crustaceous caryopsis with* 1, *membranous-coated seed, and a curved or ring-like embryo enclosing the mealy albumen* — Flowers clustered or spiked, hermaphrodite or polygamous-monœcious. Stamens sometimes alternating with staminodes. Ovules on free funicles, arising from base of ovary, ascending or pendulous, amphitropous. Utricle indehiscent or circumscissile, or caryopsis indehiscent.

* *Fruit a crustaceous caryopsis with* 1, *membranous-coated seed.*

1. DIGERA. ⊙ ♃ Leaves alternate. Flowers hermaphrodite. Sepals and stamens 5. Staminodes 0.

** * Fruit a membranous utricle, with 1, crustaceous seed.*

† Staminodes 0. Stamens as many as sepals.

2. AMARANTUS. ⊙ Utricle circumscissile. Sepals 5-3.
3. ALBERSIA. ⊙ Utricle indehiscent. Sepals 3.

† † Staminodes 5, alternating with 5 stamens.

4. ÆRVA. ♃ Pannous, desert herbs with shrubby base. Leaves alternate.
5. ACHYRANTHES. ♄ Pubescent, (not desert) shrubs. Leaves and branches opposite, the latter jointed.

1. DIGERA, Forsk. Digera.

Flowers hermaphrodite, three-bracted, ternate, the intermediate fertile, the lateral sterile, changed into a branching crest. Sepals 5, glabrous, somewhat unequal, erect. Stamens 5, free, subulate, anthers 2-celled. Staminodes 0. Ovary 1-ovuled. Style filiform, stigmas 2, recurved, short. Caryopsis crustaceous, nearly globular, included in calyx, indehiscent. Seed vertical, lenticular, witn a thin, membranous testa. Albumen central; embryo annular, peripheral; radicle somewhat ascending -- Herbs, with alternate leaves, and spiked flowers.

D. arvensis, Forsk. ⊙ ♃ .3 to .5; stems irregulary tetragonal, striate, glabrous. Leaves ovate or rounded, acute or obtuse, petioles glabrous or slightly ciliolate. Spikes slender, somewhat panicled, .15 long, .006 to .008 broad, rigid; flowers white or pinkish, .001 long; sepals twice as long as bracts, sometimes by abortion 4, ovate-lanceolate, the outer acute, 3-nerved, the inner obtuse, 1-nerved, shorter; crests shorter than fruits, the lower branches recurved, nearly entire, the upper incurved, nearly 3-lobed —

Var. **perennans,** Moquin. Stems decumbent. Leaves usually lanceolate, .04 to .05 long, .015 broad, acute — Ghor-es-Safieh, and Ghor-el-Feifeh.

2. AMARANTUS, L. Amaranth.

Flowers polygamous-monœcious, 3-bracted. Sepals 5-3, equal, erect. Stamens as many as sepals, free, filaments subulate, anthers 2-celled. Staminodes 0. Style 0. Stigmas 2-3, subulate-filiform. Utricle ovate, tapering, 2-3-beaked, circumscissile, 1-seeded, with a membranous pericarp. Seed vertical, lenticular-reniform, crustaceous; axil 0. Albumen central; embryo circular; radicle inferior — Annuals, with alternate leaves, and flowers in panicled spikes or axillary clusters.

** Stamens and sepals 5.*

† Flowers red or purple, rarely pale. Utricle a little longer than calyx.

1. A. hypochondriacus, L. ⊙ .3 to .8, glabrous or scabridulous, erect. Leaves long-petioled, *oblong-lanceolate, cuneate, acuminate.* Spikes of panicle erect, cylindrical, *obtuse, the terminal* longer; bracts *long-aristate, longer* than *deep purple* sepals; utricle 2-3-cleft at tip — Summer — Fields and vineyards ; common.

2. A. paniculatus, L. ⊙ .3 to .6, scabridulous, erect. Leaves *oblong-ovate, tapering at both ends.* Spikes of panicle erect, cylindrical, *acutish,* slender, the terminal longer; bracts aristate, longer than purple, rarely pallid sepals ; utricle 2-3-toothed at apex — Summer — Fields along coast of Palestine.

3. A. caudatus, L. ⊙ *'Urf-ed-Dîk.* .3 to .8, glabrescent or appressed-puberulent; stem erect, angled. Leaves *ovate to oblong-lanceolate*, tapering at both ends, bright green. Panicle nearly simple or branched, spikes cylindrical, *pendulous*, the *terminal very long;* flowers in dense clusters, crimson, rarely white; bracts lanceolate-subulate, *a little longer* than sepals; utricle 2-3-lobed at tip — Summer — Antioch; Haurân.

† † *Flowers green.*

4. A. chlorostachys, Willd. ⊙ .3 to .8, pale green, minutely crisp-pubescent, erect. Leaves *ovate-rhombic, rather obtuse.* Spikes of *loose* panicle ascending, *rather loose*, acute, the terminal *much longer;* bracts lanceolate-subulate, spiny, *twice* as long as *green*, linear-oblong, retuse or obtuse sepals; utricle 2-3-toothed at apex — September — Roadsides; common. Probably a variety of the next.

5. A. retroflexus, L. ⊙ .3 to .8, pale green, puberulent, stout, erect. Leaves ovate-rhombic, rather obtuse. Spikes of *compact* panicle green, *short*, sessile, the lower often rather remote, obtuse, the terminal *a little longer;* bracts lanceolate, subulate-spiny, twice as long as green, linear-oblong, retuse and *mucronate* sepals; utricle 2-3-toothed at apex — July to December — Fields and roadsides; common.

* * *Stamens and sepals* 3. *Flower clusters small, axillary.*

6. A. sylvestris, Desf. ⊙ .3 to .5, glabrescent; stem decumbent or erect, with ascending branches. Leaves rhombic-ovate to oblong-lenticular, obtuse. Flower clusters .002 to .005 long; bracts lanceolate, acute, not spiny, *as long as* linear, keeled, mucronate sepals; utricle 2-3-dentate, *twice as long* as calyx — All the year — Roadsides; common.

Var. **Græcizans**, Boiss. Leaves narrower — Waste places; less common than type.

3. ALBERSIA, Kunth. *Albersia.*

Flowers monœcious, 3-bracted. Sepals 3, equal, erect. Stamens 3, free, with subulate filaments, and 2-celled anthers. Staminodes 0. Style 0. Stigmas 3, filiform. Utricle membranous or fleshy, indehiscent, 1-seeded. Seed vertical, lenticular-reniform, crustaceous; aril 0. Albumen central; embryo circular; radicle inferior — Annuals, with alternate leaves, and clustered or spiked flowers. Differs from Amarantus by indehiscence of utricle.

A. Blitum, Kth. ⊙ .2 to .3, glabrous, branching from neck; stems diffuse or ascending. Leaves rhombic-ovate to oblong, .01 to .02 long, obtuse to retuse. Clusters dense, axillary, the lower separated, the upper approximated, forming a cylindrical spike .03 to .06 long, .01 in diameter; bracts *triangular*, acute, *shorter than lanceolate, acutish sepals;* utricle globular-ovate, *a little longer* than calyx — Summer — Roadsides and waste places; coast.

4. ÆRVA, Forsk. ÆRVA.

Flowers hermaphrodite, 3-bracted. Sepals 5, nearly equal, fleecy. Stamens 5, united at base into a cupule; filaments subulate; anthers 2-celled. Staminodes 5, tooth-like or subulate-triangular. Ovary 1-ovuled; style short; stigmas 2, minute. Utricle nearly spherical, in-

dehiscent, included in sepals. Seed vertical, lenticular, testa crustaceous; aril 0; albumen central; embryo annular; radicle ascending — White-woolly perennial herbs or shrubs with alternate leaves.

Æ. Javanica, Juss. ♃ *Yara. Shajarat-en-Na'jeh. Yerrûq. 'Ar'ah. Gheil. Tarf.* .3 to .6; stems terete, stiff, branched. Leaves obovate to oblong and oblanceolate, .01 to .035 long, obtuse, mucronulate, tapering at base into a short petiole. Spikes cylindrical, .02 to .08 long, .004 to .006 in diameter, sessile, forming terminal, leafless, simple or branching panicles; flowers *snowy white;* bracts ovate, somewhat shorter than sepals, mucronulate, the outer hairy; sepals 1-nerved; utricle oblong, .001 long, acutish — Spring — El-Ghor and valleys about the Dead Sea, and southward to Sinai and Egypt.

Var. **Bovei,** Webb. Leaves lanceolate and linear — Sinai.

5. ACHYRANTHES, L. Achyranthes.

Flowers hermaphrodite, 3-bracted. Sepals 5-4, glabrous, unequal, at length indurated. Stamens 5-4, united in a cupule at base. Staminodes 5, entire or denticulate at tip, the back sometimes with a fringed appendage. Ovary 1-ovuled. Style elongated; stigma simple, capitate. Utricle ovate or nearly globular, indehiscent, included in calyx. Seed vertical, somewhat crustaceous; aril 0. Albumen small, central; embryo annular, peripheral; radicle ascending — (Ours) shrubs with herbaceous stems and branches which are jointed at base. Leaves opposite.

A. aspera, L. ♄ *Nu'eim* .4 to .5 or more, appressed-pubescent; branches ascending, elongated. Leaves short-petioled, ovate to oblong, .02 to .06 long, acute or acuminate, the upper small, lanceolate. Spikes long, slender, from the upper axils and terminal, at length loose; flowers *greenish,* spreading, at length deflexed; *awn of lateral bracts as long as ovate limb;* sepals about twice as long as bracts, lanceolate, acuminate, obsoletely 3-nerved; utricle oblong — Spring —

Var. **argentea,** Boiss. Flowers somewhat shorter, whitish or purplish - Dry places; coast; Jordan Valley; Dead Sea; Carmel.

Order LXXXIII. CHENOPODIACEÆ. Endl. (Salsolaceæ, Moq.) (Goosefoot Family.)

Herbs or shrubs, with opposite or alternate leaves, destitute of stipules and bracts, with minute, solitary or clustered, axillary flowers, imbricated in the bud; the stamens as many as calyx-lobes or fewer, inserted opposite them or on their base; the 1-*celled,* 1-*seeded ovary becoming a membranous, coriaceous, or fleshy, indehiscent utricle* — Flowers perfect, polygamous, or diœcious. Calyx *(perigonium)* persistent, of 3-5-2 sepals, more or less united. Stamens hypogynous or perigynous, free or united at base in a cupule, sometimes alternating with staminodes, and sometimes with a hypogynous disk above the stamens or 0. Ovary free, or adherent below to the perigonium; ovule basilar; styles 2, rarely 3-4, separate or united at base. Fruit sometimes appendaged;

pericarp membranous or crustaceous. Seed horizontal or vertical (often in the same species), testa membranous or crustaceous. Embryo either more or less perfectly circular, surrounding the copious albumen, or flattened-spiral, or conical-spiral with no albumen; cotyledons narrow; radicle near the hilum.

Suborder I. **CYCLOLOBEÆ.**

Embryo circular or horseshoe-shaped, surrounding the copious albumen.

Tribe I. **CHENOPODIEÆ.** Flowers perfect. Sepals alike. Testa crustaceous. Stems not jointed.

1. CHENOPODIUM. ⊙ Perigonium 5-fid or -parted, unchanged in fruit, free. Stamens 5.

2. BETA. ⊙ ② ♃ Perigonium 5-fid, urceolate, base somewhat adherent to fruit, and at length indurated. Stamens 5.

3. BLITUM. ⊙ ♃ Perigonium 3-5-fid or -parted, (in ours) becoming berry-like in fruit. Stamen (in ours) 1.

Tribe II. **ATRIPLICEÆ.** Flowers monœcious or diœcious, sometimes polygamous, the staminate perigonium 4-5-parted, the pistillate 2-3-dentate, or replaced by 2 bracts. Testa crustaceous or coriaceous. Stems not jointed.

4. SPINACIA. ⊙ Pistillate perigonium globular, 2-3-dentate, enclosing ovary.

5. ATRIPLEX. ⊙ ♃ ♄ Pistillate perigonium 0, replaced by 2, appressed, foliaceous, more or less connate bracts.

Tribe III. **CAMPHOROSMEÆ.** Flowers perfect or polygamous, similar in form. Testa membranous. Stem not jointed.

6. CAMPHOROSMA. ♄ Perigonium tubular, 4-toothed. Stamens 4.

7. PANDERIA. ⊙ Perigonium urn-shaped, 5-toothed, fruiting teeth connivent, appendaged. Stamens 5.

8. CHENOLEA. ♄ Perigonium urn-shaped, 5-toothed, fruiting teeth not hardened or appendaged. Stamens 5.

9. KOCHIA. ♄ ⊙ Perigonium urn-shaped, 5 toothed, fruiting teeth connivent in a disk, nearly always appendaged. Stamens 5.

Tribe IV. **SALICORNEÆ.** Flowers perfect, 3-2 together, spiked-catkined, sessile, more or less immersed in axillary cups subtended by bracts. Perigonium 3-4-toothed or -parted nearly to base, teeth connivent and contiguous, forming a sort of utricle, which at length becomes spongy, and has a shield-like apex. Testa membranous. Stems usually jointed. Leaves opposite, enclosing the joints by a sort of sheath, destitute of laminæ, and connate in a short, bilobed cup, or scattered, separate, rudimentary or developed.

10. HALOPEPLIS. ⊙ Flowers immersed in a floral cup, adnate to it, more or less connate. Albumen abundant.

11. HALOCNEMUM. ♄ Flowers not connate. Seed albuminous.

12. ARTHROCNEMUM. ♄ Flowers superficially implanted in floral cup, not connate or scarcely so. Albumen 0.

13. SALICORNIA. ⊙ ♄ Flowers deeply immersed in floral cup, adnate to it, connate. Albumen 0.

Suborder II. **SPIROLOBEÆ.**

Embryo spiral. Albumen meagre, biparted, or 0.

Tribe V. **SUÆDEÆ.** Flowers perfect or polygamous, bracteoled. Fruit a utricle. Seed horizontal or vertical, the testa usually double, crustaceous and membranous. Embryo flat-spiral. Albumen 0, or forming two lateral masses separate from embryo. Stems not jointed.

14. SUÆDA. ⊙ ♄ Utricle included in perigonium, but free from it.

15. SCHANGINIA. ⊙ Utricle adnate to perigonium.

TRIBE VI. **SALSOLEÆ.** Flowers usually perfect, rarely polygamous, bibracteate. Fruit a utricle or rarely a berry. Seed horizontal or vertical, with a single, membranous tunic. Embryo conical-spiral. Albumen 0.

SUB-TRIBE I. **SODEÆ.** Seed horizontal.

** Fruiting perigonium not winged.*

16. TRAGANUM. ♃ Fruiting perigonium nut-like, with two, horn-like processes.

** * Fruiting perigonium winged.*

† Staminodes 5. Branches jointed.

17. SEIDLITZIA. ☉ Posterior wing of fruiting perigonium spoon-shaped, bent forward over fruit, the other spreading.

18. HALOXYLON. ♃ Wings of fruiting perigonium all spreading.

† † Staminodes 0. Branches not jointed.

19. SALSOLA. ☉ ♃ Wings of fruiting perigonium all spreading.

SUB-TRIBE II. **ANABASEÆ.** Seed vertical.

** Outer sepals 3, one posterior and 2 anterior ; inner sepals 2, lateral.*

20. NOEA. ♃ Stems not jointed. Lobes of perigonium connate at base.

21. ANABASIS. ♃ ☉ Stems jointed. Lobes of perigonium free to base.

** * Outer sepals 2, one anterior, the other posterior ; inner sepals 3, lateral.*

† Indument composed of long, jointed bristles, and short hair.

22. HALOCHARIS. ☉ Leaves muticous. Lobes of perigonium 5, free, unchanged in fruit.

23. HALIMOCNEMIS. ☉ Leaves spiny-tipped, Lobes of fruiting perigonium 5-4-3, united at base into a bony excrescence.

† † Glabrous.

24. HALOGETON. ♃ Two or three or all the lobes of fruiting perigonium winged or gibbous at back.

1. CHENOPODIUM, L. GOOSEFOOT. PIGWEED.

Flowers perfect, bractless. Calyx 5-cleft or -parted, with the lobes not appendaged. Stamens 5, inserted at the base of the perigonium. Stigmas 2. Utricle depressed-globular, included in perigonium but free from it. Pericarp membranous, thin. Seeds horizontal (rarely vertical) with peripheral embryo — Herbs, with flowers in small, spiked or panicled clusters.

** Embryo forming a complete ring. Scentless or fœtid herbs.*

1. C. Vulvaria, L. ☉ .3 to .6, fœtid, mealy, ash-colored; stems ascending, much branched. Leaves alternate, petioled, rhombic-ovate, .01 to .02 long, *entire.* Flower-clusters raceme-like, axillary and terminal, *leafless ;* sepals *keelless,* covering fruit; seed *dotted,* with acutish margin — May to October — Roadsides; common.

2. C. album, L. ☉ Lamb's-Quarters. Pig-weed. *Fiss-el-Kelâb.* .3 to .8, greenish or mealy, ash-colored; stems erect, ending in a stiff panicle. Leaves rhombic-ovate, .02 to .04 long, *sinuate or dentate, rarely entire,* the upper *oblong-lanceolate to linear,* entire. Flower-clusters forming compact or interrupted racemes, *leafy below ;* sepals *keeled,* covering fruit ; seed *smooth, glossy,* with acute margin — May to October — Waste places; everywhere.

3. C. opulifolium, Schrad, ☉ .5 to .8, glaucous-mealy; stem erect, paniculate-branched nearly from base. Leaves *round-rhombic,* .006 to .03 long, *obscurely-3-lobed and repand-dentate, the upper similar but smaller,* the uppermost oblong to linear. Flower-clusters in axillary

racemes or cymes, forming a narrow, stiff, leafy panicle; sepals keeled, appressed to fruit; seed glossy, finely dotted, with obtuse margins — May to September — Fields, especially along coast.

4. C. murale, L. ⊙ *Fiss-el-Kelâb. Muntineh. Sekrân. Suntar. Zurbeih. Mittein. Shajaret-el-Muteineh.* .3 to .5, green; stems ascending, branching from base. Leaves rhombic-ovate to oblong, .02 to .05 long, acute, *unequally and acutely dentate.* Cymes *axillary,* rather loose, *divaricating;* sepals keeled, enclosing fruit; seeds *opaque, rough-dotted,* with acute margins — March to November — Waste places; everywhere.

5. C. urbicum, L. ⊙ .3 to .8, green; stem stiffly and sparingly branched. Leaves *fleshy, erect, green, glossy at upper surface, sometimes mealy at lower, the lower and middle triangular,* tapering at base into a petiole, acute, irregularly acute-toothed, the upper rhombic and lanceolate, nearly entire. Flower-clusters in *dense, long, interrupted spikes, forming a long narrow thyrsus, leafy below;* sepals *not keeled,* nor appressed to fruit; seeds dotted, obtuse — March to October — Lower regions of Lebanon.

* * *Embryo forming two-thirds of a ring. Aromatic herbs.*

6. C. Botrys, L. ⊙ Jerusalem Oak. Feather Geranium. .3 to .5, glandular-pubescent, viscid; stem branching from base and above, branches ascending. Lower leaves petioled, oblong, *obtusely sinuate-pinnatifid,* upper oblanceolate-spathulate, the uppermost entire. *Cymes axillary, short,* spreading, *forming a long, stiff, narrow thyrsus nearly leafless above;* sepals keelless, enclosing seeds; seeds horizontal, nearly globular, with obtusely keeled margin — July to November — Coast and lower mountains.

7. C. ambrosioides, L. ⊙ Mexican Tea. .3 to .6, puberulent; stem grooved, paniculate. Leaves short-petioled, oblong to lanceolate, *more or less sinuate-dentate,* glandular at lower surface, the upper leaves entire. *Racemes spike-like,* ascending or spreading, *elongated,* forming a long, *leafy panicle;* fruiting calyx closed; sepals keelless; seeds horizontal, nearly globular, glossy — Spring — Ditches; Beirût. Plant with a strong, aromatic, not unpleasant smell.

2. BETA, L. Beet. *Shemandûr.*

Flowers perfect, 3-bracted. Perigonium 5-cleft, urn-shaped, somewhat adherent at base to the utricle, the tube at length indurated. Stamens 5, inserted on the fleshy rim which surrounds the ovary. Stigmas 2-3. Utricle globular, included in tube of perigonium. Seed horizontal — Annual, biennial, or perennial herbs, with axillary, or terminal, spiked flowers, solitary, or, if clustered, 2-3 together, connate at base, so as to form a spurious compound fruit which is deciduous in one mass.

1. B. vulgaris, L. ⊙ ② Beet. *Shemandûr. Libdân. Dirs-el-Kelb. Fijl-bul-leil. Silq.* .3 to .5, Stems simple or panicled. Root-leaves ovate, obtuse, cuneate, sometimes subcordate; *cauline rhombic-ovate* to lanceolate and linear. Flowers 2-3 *in a cluster* or solitary, arranged in long, slender, leafy or leafless, interrupted spikes; calyx *herbaceous,* lobes oblong, hooded, *in fruit keeled, and thickened at base into a tubercle;* stigmas 2 — September to April — Coast; Jordan Valley and Dead Sea Valleys.

Var. **typica,** Boiss. Stem 1, erect. Stigmas ovate.

Var. **maritima,** Boiss. Stems numerous, procumbent. Stigmas ovate-lanceolate.

2. **B. lomatogona,** F. et M. ♃ .3 to .5, stems erect, ending in broad, leafless panicles. Root-leaves long-petioled, ovate, often cordate, obtuse; *upper cauline oblong-lanceolate to linear*, acute. Flowers *solitary*, sessile, *yellowish*, forming long, loose, slender spikes; calyx-lobes oblong, obtuse, concave, *white-margined*, at length connivent. *tube in fruit 5-ribbed;* Stigmas 3, linear — Fields near Aintâb, and northward.

3. BLITUM, L. Blite.

Flowers perfect, bractless. Calyx 3-5-cleft or -parted, with unappendaged back. Stamens 1-5, inserted at base of calyx. Stigmas 2. Utricle free, depressed-globular, with membranous pericarp. Seeds vertical — Herbs with aspect of Chenopodium.

B. virgatum, L. ☉ ♃ .2 to .4, glabrous; stem branching from base, branches ascending. Leaves green, petioled, *oblong-triangular*, .01 to .05 long, often *hastate at base*, acuminate, acutely and sparingly incised-dentate. Clusters globular, sessile in all the axils, forming a long, leafy, interrupted spike, the clusters .003 to .004 broad in fruit, *crimson*, *berry-like*, perigonium not closed — Summer — Subalpine and alpine regions of Lebanon, Antilebanon, Akher Dagh, and northward.

4. SPINACIA, L. Spinach. *Sbânakh.*

Flowers diœcious, bractless. *Staminate.* Perigonium 4-5-parted, herbaceous, lobes not appendaged. Stamens 4-5, inserted at bottom of perigonium, filaments capillary. *Pistillate.* Perigonium nearly globular, 2-3-dentate at tip, including the ovary, in fruit coriaceous, sometimes unarmed, unappendaged, at others furnished with 2-3 prickles, springing from the tube, and growing. Stigmas 4, long, filiform, connate at base. Nutlet adherent to perigonium, compressed. Seed vertical, with thin testa. Embryo peripheral, surrounding the farinaceous albumen — Annual herbs, with the staminate flowers in terminal, leafless spikes, the pistillate clustered in the axils.

S. tetrandra, Stev. ☉ .3 to .5, glabrous, branching from neck into erect or ascending stems. Root- and lower stem-leaves of *staminate* plant oblong to oblanceolate in outline, pinnatisect into oblong to linear-lanceolate lobes, upper stem-leaves *linear-lanceolate to linear*, dentate to entire. Root- and lower stem-leaves of *pistillate* plant oblong, pinnatilobed into triangular, obtuse or acutish lobes, upper stem-leaves *oblong to oblong-ovate*, half-clasping at base, obtusely lobed to entire. Staminate spikes interrupted, leafless, simple, or thyrsoid-panicled; pistillate spikes simple, leafy, floral leaves much longer than flowers; lobes of fruiting perigonium connate, with two, broad, triangular, horizontal, spiny horns — Spring — Salt marshes; Palmyrene Desert.

5. ATRIPLEX, Tourn. Orache.

Flowers monœcious or somewhat diœcious, rarely perfect. Staminate or perfect perigonium 5-parted, pistillate 0, replaced by 2, free or

more or less united, flattened, bracts forming a sheath. Stamens 3-5, inserted at base of perigonium. Ovary ovate, flattened. Styles 2, setaceous. Utricle membranous, included. Seed vertical (in perfect flowers horizontal), with crustaceous testa. Radicle pointing to base or apex of ovary — Herbs or shrubs.

* *Flowers polygamous, the pistillate 2-parted, the perfect few, 5-parted. Annuals.*

1. A. nitens, Rebent. ⊙ Stem erect, angled, branching. Leaves alternate, petioled, green at upper surface, silvery-scaly at lower, cordate-triangular, sinuate-dentate, rarely entire, the upper triangular-lanceolate, long-tapering. Racemes from upper axils and terminal, long, loose, panicled; fruiting bracts nearly free, growing, membranous, reticulate, entire, ovate, obtuse or acutish — Summer — Fields; Damascus.

* * *Flowers monœcious or rarely diœcious, the pistillate 2-fid or -parted, the staminate 5-parted.*

† *Annuals.*

‡ *Bracts parted to base.*

2. A. littorale, L. ⊙ .3 to 1, green, simple or branching. Leaves *linear-lanceolate to linear*, entire or denticulate. Fruiting bracts rhombic-triangular, entire or 1-2-dentate at base, muricate or rarely unarmed — September and October — Salt marshes and sands along coast; Tripoli; Alexandretta.

3. A. hastatum, L. ⊙ .3 to 1, green or scurfy-canescent, branching. Leaves *triangular-hastate, truncate at base*, entire or sinuate-dentate, the upper *hastate-lanceolate* to lanceolate and linear. Fruiting bracts triangular-deltoid, 1-2 dentate at base, unarmed or tubercled — June to October — Roadsides and waste places; Tripoli. Perhaps only a variety of the last.

Var. **salinum,** Wallr. More or less scurfy; leaves narrower, hastate but entire; calyx-lobes entire — Coast.

4. A. Amanum, Post. ⊙ .3 to .8, green, *minutely pruinose*, loosely panicled from base. Leaves short-petioled, alternate or opposite, *oblong to linear-lanceolate and linear, entire.* Flowers in clusters of 2-3, forming axillary and terminal, interrupted, *naked* spikes; bracts *round ovate*, .002 to .003 long, with a tooth on each side above the middle, sparingly and minutely pruinose — September — Rocks below summit of Gesbel Dagh (Amanus).

5. A. dimorphostegium, Kar. et Kir. ⊙ *Zurbâḥ.* .2 to .3, branching from neck, prostrate or ascending. Leaves alternate, *beset with crystalline papilli*, especially at under surface, grey, petioled, truncate at base or short-cuneate, *ovate*, obtuse, entire. Some of the flowers arranged 2-3 in a cluster in the lower axils, with fruiting bracts .006 long, stipitate, reflexed, membranous, cordate-orbicular, smooth at back, repand-denticulate at margin, the others in short, terminal spikes, the fruiting sepals much smaller, triangular-ovate, crested at back — Spring — Sandy places; southern deserts; Syria.

‡ ‡ *Bracts parted only to or above middle.*

6. A. Tataricum, L. ⊙ *Qataf.* .5 to 1, at length indurated, usually scurfy-white; stems erect or diffuse, much branched. Leaves

short-petioled, alternate or the lowermost opposite, *hastate-deltoid*, dentate, incised, lobed, or rarely entire, the upper *lanceolate to lanceolate-linear.* Flower-clusters *crowded in naked, usually more or less interrupted spikes;* bracts rhomboid or somewhat 3-lobed, dentate or entire, more or less tubercled at back — Summer — Syrian Desert; Aintâb.

Var. **virgatum,** Boiss. Stems slender, rigid. Spikes slender. Leaves oblong-lanceolate to linear-lanceolate, sparingly denticulate or entire, cuneate at base — Palestine to Cœlesyria, subalpine Lebanon, Qaryetein, Antioch, Aintâb, Marash, and northward.

7. A. roseum, L. ⊙ .5 to 1, at length indurated, canescent; stems erect or ascending, forked. Leaves barely petioled, alternate, the lower ovate to triangular-rhombic, unequally sinuate or dentate; the upper ovate-oblong. Flower-clusters sessile, *axillary, scattered, forming leafy racemes;* bracts triangular-rhombic, acutish, angled or dentate, with smooth or tubercled disk — Summer — Roadsides and sandy places; coast and interior.

* * *Perennials.*

† *Leaves opposite.*

8. A. portulacoides, L. ♄ .5 to 1, *silvery-scurfy;* stems procumbent at base, then ascending. Leaves short-petioled, tapering at base, oblong to lanceolate-linear, .02 to .06 long. Flower-clusters loosely spiked, forming small, terminal, leafless panicles; *bracts canescent,* long-cuneate at base, somewhat stalked, 3-toothed at tip, the teeth short, triangular, about equal, or the intermediate one smaller, mucroniform — July to November — Coast.

† † *Leaves alternate.*

9. A. Autrani, Post. ♄ 1 or more; stems and branches *puberulent to glabrescent,* whitish. Leaves alternate, *minutely scurfy,* pale green, oblong to oblong-linear, .02 to .04 long, .005 to .01 broad, very short-petioled, obtuse to acutish, entire. Clusters of staminate flowers in dense, leafless, terminal spikes, .02 to .04 long, sometimes with 1-2 branches at base; *fertile flowers solitary, in lower axils,* bracts rhombic, glabrous, herbaceous toward tip, with 3-5-elevated nerves, netted-veined, with 1-3, *more or less obsolete teeth just above angle on each side,* entire toward acute, mucronulate tip — July and August — Rolling tableland, Jebel Bil'âs (Syrian Desert).

10. A. Palæstinum, Boiss. ♄ .2 to .4, *papillose-mealy,* canescent; stems numerous, ascending, terete, leafy. Leaves elliptical to *oblong and oblong linear,* .01 to .03 long, sessile, tapering at base, entire, or obtusely sinuate-repand, the uppermost linear, acute. Flowers densely fascicled in axils, the two kinds together, forming terminal, interrupted spikes or panicles, and fertile flowers alone in lower axils; bracts .002 long, oblong-rhombic, cuneate at base, entire, 3-4-tubercled — Spring — Desert of Judea, and borders of et-Tîh, and around Dead Sea, to Antilebanon, Damascus and Palmyra.

11. A. crystallinum, Ehr. ♄ .2 to .25, canescent; stems diffuse or ascending. Leaves *round,* .004 to .006 in diameter, *entire,* the axils bearing leaf-clusters. Flower-clusters crowded in slender, terminal, interrupted, simple or branched spikes; fruiting bracts .003

long, ovate-rhombic, somewhat 3-lobed, the *terminal lobe much longer*, ovate, the *dorsum crested-tubercled* — Spring — 'Aqabah.

12. A. leucocladum, Boiss. ♄ *Shajaret-el-Bayyaḍîn. Rudhl. Roghr. Rughl. Burghul.* .3 to 1, silvery-white; stems numerous, ascending, white, diffusely branched. Leaves short-cuneate to truncate at base, *deltoid-ovate to oblong*, .01 to .03 long, obtuse, entire or sinuate-dentate, the lower short-petioled, the rest sessile, the uppermost minute. Flower-clusters in loose, simple or panicled, short, almost leafless spikes; fruiting bracts .005 long and broad, united to middle, *round*, cuneate at base, 3-lobed, with *unarmed* disk; lobes rounded, obtuse, the intermediate somewhat larger — Spring and summer — Sinaitic desert and et-Tîh to Dead Sea, Jordan Valley, Judean Desert, Damascus, and Syrian Desert.

13. A. Halimus, L. ♄ .3 to 1, silvery white; stems woody, with spreading branches. Leaves short-petioled, cuneate at base, ovate, obtuse, entire or obsoletely repand at base, .01 to .02 long. Flower clusters *densely-spiked*, spikes somewhat interrupted, forming a *long, thyrsoid-pyramidal*, leafless panicle; fruiting bracts sessile, cordate or short-cuneate and *scarcely united at base, reniform, broader than long, margin entire or obsoletely denticulate*, disk unarmed, reticulate — Summer — Coast; around Dead Sea; near Riblah (Cœlesyria).

14. A. farinosum, Forsk. ♄ *Huway. 'Asfay.* .5 to .8 or more, *mealy-canescent;* branches ascending, thick, densely leafy. Leaves short-petioled *elliptical*, .03 to .04 long, .02 to .025 broad, obtuse or retuse, *cordate with a narrow sinus and small, obtuse auricles at base*, entire. Flower-clusters densely spiked, arranged in a terminal, almost leafless, much branched panicle, .06 to .15 long; fruiting bracts .005 to .007 long, *oblong spathulate, entire, spongy, connate to their middle*, rounded at tip, with an inflated, unarmed disk — Summer — Jebel Naqûs (Sinai).

6. CAMPHOROSMA, L. Camphorosma.

Flowers hermaphrodite or by abortion polygamous, bractless. Perigonium short-tubular, compressed, 4-toothed, unchanged in fruit, the teeth erect, the outer two herbaceous, keeled, the inner two somewhat smaller, membranous, flat. Stamens 4, rarely 1, inserted at base of perigonium, anthers exserted. Style filiform, stigmas filiform, 2-3. Utricle compressed, included in perigonium, with membranous pericarp. Seed vertical, with membranous testa, Embryo ring-shaped, enclosing the small albumen — (Ours) shrubs, with axillary, sessile flowers.

C. Monspeliacum, L. ♄ .2 to .5, branching from base, pubescent or hirsute-canescent; some of the branches sterile, beset with clustered leaves, others elongated, prostrate or ascending-erect, simple or panicled. Leaves stiff, linear-subulate, straight or recurved. Flowers by abortion polygamous, spiked in dense clusters, the sterile clusters ovate, each flower subtended by a linear-lanceolate leaf a little longer than itself; teeth of perigonium acute, unequal — Late summer and autumn — Salt marshes of coast (Tristram). Others have not reported it.

7. PANDERIA, Fisch. et Mey. Panderia.

Flowers polygamous or perfect, bractless. Perigonium urn-shaped, equally 5-toothed, the teeth connivent in fruit, closing the throat,

arched, and produced at back into a triangular tubercle or minute, transverse wing. Stamens 5, inserted at bottom of perigonium, anthers exserted. Style short, long-bifid. Utricle included in the closed perigonium, pericarp very thin. Seed vertical. Embryo nearly ring-shaped — Annual herbs, with aspect of Kochia.

P. pilosa, Fisch. et Mey. ⊙ .2 to .3, hairy; stem simple or branching from base, panicled. Leaves alternate, sessile, oblong-lanceolate, .005 long, .0015 broad, obtuse. Flowers 2-3 in a cluster, sessile, arranged in short, dense spikes, the flowers intermixed with and overtopped by short, linear leaves — Autumn — Roadsides and salt marshes; Damascus, and eastward, and northward.

8. CHENOLEA, Thunb. CHENOLEA. *Thelatheh.*

Flowers hemaphrodite, or by abortion polygamous, bractless. Perigonium urn-shaped, with 5, short, fleshy, somewhat keeled, woolly lobes, not becoming indurated or appendaged. Stamens 5, inserted at the bottom of the perigonium, anthers exserted. Ovary ovate. Style divided into 2, filiform lobes. Utricle depressed, included in the unchanged but closed perigonium, pericarp membranous. Seed horizontal, testa membranous. Embryo peripheral, albumen little or 0 — Low, fleecy-canescent shrubs.

C. Arabica, Boiss. ♄ *Thelatheh* .1 to .3; flowering branches ascending, fleecy, ending in spikes interrupted at base. Leaves sessile, oblong-linear, .005 to .01 long, .0015 broad, obtuse. Flowers 5-15 in ovate or globular, sessile clusters, spikes leafy, .03 to .1 long; floral-leaves ovate-oblong to oblong, glabrescent, about as long as flowers; lobes of perigonium cocoony, hemispherical — March to July — Valleys about Dead Sea, and in et-Tîh; Syrian Desert, and eastward to Mesopotamia.

9. KOCHIA, Roth. KOCHIA.

Flowers hermaphrodite, or by abortion pistillate, bractless. Perigonium urn-shaped, 5-fid, fruiting lobes connivent into a disk, appendaged at back (except K. latifolia, var. inermis). Stamens 5, inserted at bottom of perigonium. Style divided into 2, filiform lobes. Utricle depressed, included in the perigonium; pericarp membranous. Seed horizontal (rarely even in the same species vertical); testa membranous. Embryo nearly circular, surrounding the albumen — Shrubs or herbs.

1. K. monticola, Boiss. ⊙ .05 to .15, pubescent to hirsute, branching from neck; branches decumbent or ascending, simple, stiff, slender. Lower leaves linear, .01 long, tapering at base, rather obtuse; floral leaves oblong, as long as flowers or longer. Flowers 1-3 together, sessile, axillary, forming slender, at length elongated, loose spikes; perigonium ovate-oblong, somewhat membranous, lobes ovate, connivent, the dorsal nerve ending in a short, conical, green tubercle — Summer — Sandy places; alpine Lebanon and Antilebanon.

2. K. hyssopifolia, Pall. ⊙ .5 or more, hirsute or villous, simple or ∞-stemmed; stems erect, white, rigid, paniculate-branched. Leaves oblong-linear, .005 to .01 long, acute, flat, thin; the floral oblong, longer than flowers, fleecy at base. Flowers 2-3 in a sessile cluster, forming interrupted spike-like racemes, .05 to .1 long; spine

of fruiting perigonium subulate, spreading, not dilated at base, truncate at tip, as long as disk or longer — Autumn — Sandy and clayey places; Damascus.

3. K. muricata, L. ⊙ *Layyah.* .3 to .5, *densely villous*, usually many-stemmed from neck; stems erect or ascending, panicled. Leaves *linear-lanceolate*, .005 to .015 long, somewhat fleshy, flat. Flowers 1-3 in a cluster, sessile, subtended by deciduous, oblong leaves as long as clusters or longer; spikes loose; spines of fruiting perigonium needle-shaped, yellow, spreading, *straight, twice to thrice as long as disk* — Spring — Sands and fields in and near deserts of Sinai, and westward to Egypt.

4. K. latifolia, Fres. ⊙ .2 to .3, branching from neck; branches brittle, *fleecy.* Leaves *oblong-linear*, obtuse, .01 long, sparingly hirsute, the floral *oblong-linear to elliptical.* Flower-clusters *densely spiked, almost hidden by dense, long fleece;* spines of fruiting perigonium subulate, *as long as disk, with incurved tip* — April to June — Rocky and sandy places; Sinai; Deserts around Dead Sea; Syrian Desert.

Var. **inermis,** Boiss. Some of the upper flowers perfect with a vertical seed, others perfect or pistillate, sterile, or with a horizontal seed. Fruiting perigonium not appendaged — Sinai.

10. HALOPEPLIS, Bunge. Halopeplis. *'Adû.*

Branches necklace-shaped or nodular. Leaves few, free, the adnate base of the upper leaves clasping. Bracts spirally arranged. Flowers three together, more or less connate, spiked, adnate to the walls of the floral cup. Tip of perigonium tridenticulate, small, rather convex, not winged. Albumen central, abundant, embryo hooked, radicle ascending — Shrubs or (ours) annual herbs.

H. amplexicaulis, Vahl. ⊙ *'Adû.* .1 to .3, glaucous; stem at length often indurated below, branching from base; branches horizontal and ascending, nodular. Leaves minute, alternate, half-globular, clasping, obtuse, with rudimentary lamina. Spikes sessile, alternate, oblong, .005 to .015 long, racemed; flowers connate to tip; stamen 1 — May to August — Coast near Gaza, and southward to Egypt.

Fig. 315.



Terminal spikes of Halopeplis amplexicaulis.

11. HALOCNEMUM, M. B. Halocnemum. *Sabteh.*

Stems jointed. Leaves minute, opposite, connate, with a rudimentary lamina. Bracts opposite, free, at length deciduous. Flowers three together, connate, spiked. Perigonium three-leaved, club-shaped, the leaves free, arched-inflexed at tip. Seed albuminous, embryo incurved, radicle ascending — Shrubs.

H. strobilaceum, Pall. ♄ *Sabteh.* .3 or more, much branched; branches and branchlets ascending, with short, thick, club-shaped or cylindrical joints, the top of each of which ends in an obtuse cupule of

leaves, enclosing *globular, sterile buds.* Spikes oblong to cylindrical, sessile, lateral and terminal; lamina of bracts semicircular; stamen 1— Summer—Coast of Sinaitic Peninsula.

12. ARTHROCNEMUM, Moq. ARTHROCNEMUM. *Ushnân.*

Stems and branches jointed. Leaves opposite, connate, with rudimentary lamina. Bracts opposite, connate, persistent. Flowers spiked, ternate, not at all or barely connate, slightly adherent to the floral cup. Perigonium trifid at tip, obtusely pyramidal. Seed albuminous, embryo rod-shaped, with inferior radicle—Shrubs.

A. glaucum, Del. ♄ *Ushnân. Khureiseh. Khimâm. Khinân.* .3 to .5; branches erect, or procumbent, rooting at base; flowering twigs erect. Spikes thick, cylindrical, obtuse; bracts entire, covering the flowers, which are at length partly but not wholly exserted; stamens 2; pericarp membranous; testa black, glossy, beset with short, conical papillæ — Summer and autumn — Salt marshes; Ṭôr.

13. SALICORNIA, L. GLASSWORT. SAMPHIRE.

Stems and branches jointed. Leaves opposite, connate in pairs, with rudimentary lamina. Bracts opposite, connate, persistent. Flowers ternate, spiked, connate, immersed in the floral cup, and adnate to its walls, the cup after the falling of the fruit divided by septa into 3 cells. Perigonium plano-convex at tip, 3-4-denticulate at middle. Seed destitute of albumen, embryo conduplicate, cotyledons near the inferior radicle — Shrubs or herbs.

1. S. fruticosa, L. ♄ *Khureiseh. Ḥaṭab Ḥaddâdeh. Abu Sâq. Bu-Sâq. Bawwâl. Ghassûl. Ḥamḍ.* .3 to .4; *stems and first branches often rooting below*, decussate-branched. Spikes cylindrical or cylindrical-club-shaped, obtuse; cells of floral cup 3, *side by side;* tip of perigonium of middle flower pentagonal or trapezoidal — Spring — Salt marshes; coast and around Dead Sea.

2. S. herbacea, L. ⊙ *Qali.* .1 to .3, erect or procumbent, *not rooting*, decussate-branched. Spikes cylindrical, tapering at tip; cells of floral cup *arranged triangularly;* tip of perigonium of middle flower obovate-rhombic — Spring and summer — Salt marshes: coast and interior.

14. SUÆDA, FORSK. SEA BLITE.

Flowers perfect or polygamous, solitary or clustered in the axils of the scale-like bracteoles. Perigonium 5-parted or -cleft, free from ovary, the lobes unchanged in fruit, or becoming fleshy, or spongy-inflated. Stamens 5, inserted on the perigonium. Stigmas 2-3. Utricle included in the perigonium, but free from it. Seeds horizontal or vertical, albumen little or 0 — Herbs and shrubs growing in salt marshes and sandy places.

* *Shrubby perennials.*

† *Flower clusters adnate to petiole, above axil.*

1. S. Asphaltica, Boiss. ♄ 1 or more; branches white woody, slender. Leaves *beset with whitish scales*, filiform, .01 to .02 long, .001 to .0015 broad, somewhat petioled, the floral smaller. Clusters sessile, 1-3-flowered, forming long, loose, leafy spikes; flowers perfect; perigonium *minute*, lobes ovate, membranous-margined; seed *horizontal*,

glossy, smooth — Spring — Shore of Dead Sea, and valleys around it to ocean level; el-'Arabah; Salt marsh, Qaryetein; Hammâm Abu Rabâḥ (Syrian Desert).

†† *Flower clusters axillary.*

2. S. fruticosa, L. ♄ *Haṭab-Shâmi. Haṭab-Suweidi.* .5 to 1 or more; branches white, stiff, leafy. Leaves fleshy, *semi-terete*, *linear-cylindrical*, .01 to .015 long, .001 to .002 broad, the floral smaller. Clusters sessile, 1-5-flowered, forming long, rather dense, leafy spikes; flowers perfect; perigonium nearly globular, .001 broad, lobes ovate, concave, obtuse, incurved at tip; seed usually *vertical*, glossy, smooth — April to August — Sands along coast; salt marshes and deserts about Dead Sea, and southward to Egypt.

3. S. monoica, Forsk. ♄ *'Asal. Khurîyeh. Ḥamḍ.* 2 to 5; branches erect, yellowish, twigs, *spreading or drooping*, leafy. Leaves fleshy, oblong-linear, .01 to .02 long, .002 to .003 broad, *flattish*, obtuse. Panicle terminal, compound, short. Flowers *polygamous;* clusters sessile, 1-3-flowered, forming short, terminal, rather loose spikes; *floral leaves elliptical*, *tapering* at base, the upper shorter than flowers; fruiting perigonium *crimson*, obovate-oblong, .002 long; seed vertical, glossy, somewhat beaked — August — Sinai; el-'Arabah; around Dead Sea. A showy shrub, with dense panicles of drooping spikes, loaded with small, crimson, berry-like fruits.

4. S. vermiculata, Forsk. ♄ *Suweid*, .2 to .3; branches whitish, divaricate, intricate. Leaves *succulent*, .005 to .01 long, .003 to .004 broad (resembling those of a Sedum), *the lower obovate-oblong*, *the upper nearly globular*. Flowers perfect, solitary or 2-3 in a cluster, shorter than floral leaves, in short, loose spikes; fruiting perigonium .001 broad, ovate, lobes connivent; seed vertical, not beaked — Spring — Dead Sea and Et-Tîh to Sinai and Egypt.

* * *Annuals, often with indurated base.*

5. S. Maris Mortui, Post. ⊙ .3 to 1, glabrous, much branched from base, paniculate. Leaves scurfy, the cauline filiform, .005 to .012 long, .001 thick, fleshy, *the floral oblong-spathulate to obovate*, obtuse, the lower a little longer than flowers, the upper about as long. Spikes loose, .1 to .2 long; clusters 2-3-flowered, sessile, free from petiole; lobes of perigonium ovate, obtuse, connivent — August — M'Baghik and 'Ain Jidi (Dead Sea).

6. S. carnosissima, Post. ⊙ .3 to .4; glabrous, much branched from base, paniculate. Leaves very fleshy, dotted with vesicles, *elliptical to oblong*, .005 to .008 long, .004 to .0015 broad, obtuse or acutish. Spikes .01 to .02 long, dense; clusters 1-2-3-flowered, sessile, free from petiole; lobes of minute perigonium round-ovate, imbricated-connivent, including fruit — July — at foot of mountains south of Qaryetein (Syrian Desert). A species, the fleshy leaves of which are dried with difficulty, and covered when dry with salty efflorescence.

15. SCHANGINIA, C. A. Mey. SCHANGINIA.

Flowers perfect or polygamous, solitary or clustered, subtended by minute, scale-like bracts. Perigonium urn-shaped, adnate to ovary, the five, fruiting lobes furnished with a tubercle, or inflated, or un-

changed. Stamens 5, inserted on the perigonium. Stigmas 2-3. Utricle membranous, adnate to perigonium. Seed vertical, crustaceous. exalbuminous, beaked at base — Herbs or shrubs with aspect of Suæda.

S. baccata, Forsk. ⊙ *Mulleih. Tartîr. Tahamah.* .2 to .3, glabrous, glaucous, more or less mealy, branching from neck, densely leafy; the lateral branches spreading, the central often erect. Leaves fleshy, semi-terete, linear-cylindrical, .015 to .02 long, .001 broad, spreading, the floral much longer than flowers. Flowers perfect, clustered, forming long, leafy spikes, loose below, denser above; fruiting perigonium top-shaped, as large as a hemp seed, the lobes ovate, gibbous-inflated, spongy; seed beaked, smooth — Spring — Merj Damascus; Sinai to Egypt.

16. TRAGANUM, Del. Traganum.

Flowers perfect, bibracteate, axillary. Perigonium 5-fid, in fruit thickened below, nut-like, furnished in front and behind with a horn-like, conical, obtuse, hard protuberance, the lobes membranous, wingless. Disk small. Staminodes 0. Stamens 5, with broad, exserted filaments. Anthers sagittate, acute. Style bifid, stigmas filiform. Utricle somewhat depressed, included in the woody perigonium, pericarp membranous. Seed horizontal — A much branched shrub, with branches not jointed.

T. nudatum, Del. ♄ *Feres. Hamd. Thirr. Zamrân.* .2 to .5, divaricate-branched; the branchlets slender, intricate, white, glabrous or scabridulous. Leaves alternate, .004 to .005 long, distant, fleshy, triquetrous, oblong, mucronate, somewhat recurved, keeled. Axils fleecy; flowers 1-3 in a cluster; bracteoles ovate-triquetrous, a little shorter than the floral leaf; calyx-lobes membranous, oblong-lanceolate, obtuse, erect — May — Northern borders of et-Tîh to Sinai and Egypt.

Fig. 316.



Piece of flowering stem of Traganum nudatum.

17. SEIDLITZIA, Bunge. Seidlitzia.

Flowers perfect, bibracteate, axillary, opposite, solitary or 2-3 in a cluster, the lateral often withering. Staminodes 5, semi-orbicular, glandular-ciliate, united into a staminate disk; filaments 5, exserted, anthers muticous. Leaves of perigonium 5, united at base, elliptical, obtuse or bilobed, in fruit parchment-like, furnished toward middle with broad, membranous, transverse wings, the posterior wing spoon-shaped, bent forward, covering the fruit, the others spreading. Style minute, with two stigmas at tip. Utricle depressed. Seed horizontal — Annual herbs or shrubs, with jointed stem and branched, and opposite leaves.

1. S. florida, M. B. ⊙ Glaucous, glabrous, succulent; stem erect, branching from base; branches simple or sparingly branched, spreading or decumbent; lower joints elongated. Leaves terêtish, short, obtuse, spreading, and at length deflexed. Bracteoles ovate, obtuse, longer than flower, boat-shaped, obtuse, membranous-margined; flowers small, immersed in base of floral leaf; wings of fruiting perigonium pink, obovate-orbicular, broad, narrowed at base; wings of lateral, atrophied flowers minute, scale-like — Summer — Eastern Desert (Tristram).

2. S. lanigera, Post. ♄ .3 to .5, woody at decumbent base; branches brittle, ascending, intricately branched, pale, the lower segments .02 to .05 long, the upper becoming shorter. Leaves *fleshy, triquetrous,* half-clasping at base, hollowed at upper surface, .007 to .003 long, .002 to .0025 thick, obtuse, *axils densely packed with fleece as long as leaves* — August — M'Baghik, shore of Dead Sea. Plant with the jointed stems and opposite leaves of a Seidlitzia, but as yet destitute of flowers and fruits.

18. HALOXYLON, Bunge. Haloxylon. *Belbel.*

Flowers perfect, bibracteolate. Perigonium 5-parted, the leaves growing after flowering into spreading, scarious, transverse wings. Staminodes 5, united into an urn which is connate with the filaments, but free at tip. Anthers muticous. Style short or 0, stigmas 2-4. Utricle top-shaped, concave above, fleshy, enclosed in the open perigonium. Seed horizontal — Shrubs, with jointed branches, usually opposite, connate, rudimentary or minute leaves, and solitary, axillary flowers — Distinguished from Salsola by jointed stem, staminodes, and monadelphous filaments.

H. articulatum, Cav. ♄ *Niqûn. Belbel. Tufweh. Laitûn.* .3 to .5, glabrous, green. Leaves scale-like at tip of joint, short-triangular, connate into a cup which is minutely villous within. Staminodes shorter than ovary; style short; stigmas 2, divergent; fruit with wings .005 to .009 across, wings nearly equal, obovate-orbicular, with eroded margins — October and November — Um Jemâl (Moab); Damascus; Palmyrene Desert, and eastward; Et-Tîh, and southward and westward to Egypt.

19. SALSOLA, L. Saltwort.

Flowers perfect (rarely polygamous), axillary, bibracteate, usually solitary. Perigonium 5-fid or -parted beyond middle or nearly to base, base indurated or membranous, lobes at length growing, transversely membranous-winged (rarely keeled). Hypogynous disk cup-shaped, more or less manifest. Staminodes 0. Stamens 5 (rarely in staminate flowers 4) exserted, anthers muticous or mucronate or appendaged by the production of the connective. Style bifid. Fruit a depressed, dry utricle, or rarely berry-like. Seed horizontal — Annuals or shrubs, with branches not jointed.

* *Annuals.*

1. S. Kali, L. ♄ .3 to 1, *hirsute or glabrescent,* divaricately branched from base, branches procumbent or ascending. Leaves alternate, fleshy, half-clasping at base, lanceolate, subulate-spiny at tip,

semi-terete. Flowers solitary or 2-3 in a cluster, axillary, more or less spiked; bracts ovate, spiny-tipped, somewhat longer than perigonium; fruiting perigonium indurated, rounded at base; wings obovate to reniform — October — Sands of coast, and salt marshes of interior.

2. S. inermis, Forsk. ⊙ *Jumaili. Nadewa.* .1 to .5, at length indurated, *papillose-mealy;* stems prostrate or ascending, or branching from neck. Leaves small, the *lowermost soon deciduous,* half-clasping, short-linear, acutish, the *upper and floral ovate-triquetrous,* the latter imbricated. Flowers small, solitary, loosely spiked along the branches; bracteoles orbicular, mucronulate, about as long as floral leaf: divisions of fruiting perigonium mealy, triangular, connivent into a disk; wings inserted at their middle, obovate, sinuate at margin, *produced to the base of the perigonium in an elevated nerve* — Spring and summer — Judean Desert; Palmyrene Desert.

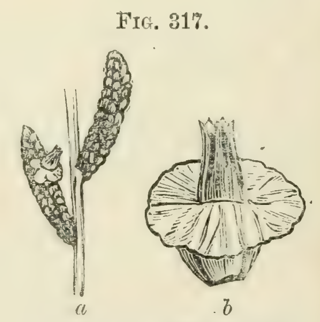
3. S. Autrani, Post. ⊙ .2 to .5, *soft-pubescent with intermixture of flexuous villi;* stem branching from base, branches effuse or pyramidal-paniculate. Leaves *remaining during inflorescence,* sessile, somewhat expanded at base, linear, .01 to .005 long, obtuse, the floral *oblong to ovate.* Flowers small, solitary, somewhat densely or loosely spiked along the branches; bracteoles orbicular, *puberulent, green,* about as long as floral leaves; lobes of flowering perigonium ovate, obtuse; fruiting perigonium * * — July — (Mar Lian) Qaryetein, and eastward in desert to Eṣ-Ṣafah.

* * *Perennials.*

† *Branches and leaves opposite.*

4. S. tetrandra, Del. ♄ *Thulayyith. 'Arâd. Jill. Zamrân. Damrân.* More or less papillose-pubescent and white; branches tortuous, the lower spreading. Leaves *minute, scale-like,* fleshy, short-triangular-ovate, obtuse, densely imbricated along the short, *catkin-like, tetragonal-cylindrical* branches of the inflorescence. Flowers axillary, solitary, the catkins spiked; bracteoles ovate, obtuse, concave, similar to leaves; lobes of fruiting perigonium lanceolate, connivent in a cone, silky at outer face; wings small, inserted below middle of perigonium — Summer — Around Dead Sea, and southward to Sinai and Egypt.

FIG. 317.



(*a*) Two spikes of Salsola tetrandra. (*b*) A single flower magnified 6 diameters.

5. S. longifolia, Forsk. ♄ .3 to .5, glabrous, sparingly mealy; branches ascending or erect, short, stiff, with short twigs. Leaves fleshy, linear, terete-triangular, obtuse, the floral *oblong, hooded,* obtuse, longer than concave, orbicular bracteoles. Flowers opposite along the twigs, forming long and loose or short and dense spikes; tube of fruiting perigonium nearly globular, with elevated, longitudinal nerves, and somewhat pentagonal, basilar areola; lobes *short-ovate,* obtuse,

wings orbicular, narrowed at base — Autumn — Ras Hish (Dead Sea) and Jebel Usdum, and southward to Egypt; Palmyrene Desert ?

† † *Branches and leaves alternate.*

6. S. lancifolia, Boiss. ♄ .3 to .5, glabrous, glaucous; stems wand-like, angled, paniculate-branched. Leaves *more or less decurrent, linear-lanceolate, flat,* the floral linear, longer than the *triangular, acute* bracts. Flowers loosely spiked along branches; lobes of fruiting perigonium triangular, membranous, acute, connivent; wings inserted at middle of perigonium, orbicular, crenulate, forming a fruit .01 to .013 in diameter — July — Deir 'Atîyeh to Qaryetein (Syrian Desert); Dead Sea.

7. S. glauca, M. B. ♄ .3 to .4, glabrous, glaucous; lower branches ascending or procumbent, flowering branches erect, terete, simple or panicled above. Leaves linear, .015 to .03 long, *teretish,* fleshy, *not decurrent,* floral linear, short, longer than *ovate, short-caudate,* keeled bracteoles. Flowers solitary, in long, loose spikes; lobes of fruiting perigonium triangular-lanceolate, rather obtuse, connivent; wings arising below middle of perigonium, orbicular-obovate, eroded-crenate; fruit .012 broad — Summer — Palmyrene Desert.

8. S. rigida, Pall. ♄ *Khureit.* .5 to .8, *villous with denticulate, yellow hairs;* the old branches prostrate or ascending, the more recent slender, stiff, simple or paniculate-branched. Leaves alternate, *filiform,* .01 long, obtuse, spreading or recurved; axils bearing tufts of small leaves; floral leaves short, as long as or longer than flowers. Flowers solitary in loose or dense spikes; bracteoles ovate, keeled, often with herbaceous cusps; lobes of perigonium villous, triangular-ovate, erect; wings arising about middle, kidney-shaped, imbricated — Summer —

Var. **tenuifolia,** Boiss. Leaves filiform-setaceous — Rocky places and sterile plains and deserts of interior; Dead Sea.

9. S. canescens, Moq. ♄ .2 to .3, *canescent with appressed hairs or glabrescent;* trunk tortuous; some of the newer branches short, sterile, densely leafy, others more or less elongated, slender, simple, ending in long, loose spikes. Leaves linear, .01 to .02 long, flat or obsoletely triquetrous, acutish or obtuse, erect; floral leaves shorter, longer than somewhat coriaceous, ovate, abruptly caudate bracts. Flowers rather large, scattered; lobes of perigonium hairy, membranous, rigid, oblong-lanceolate, obtuse, longer than bracteoles; wings arising near middle of perigonium, transversely oblong, medium sized — Summer — Makmel (Lebanon), 1800 m.

20. NOEA, Moq. Noea.

Flowers perfect, solitary, bibracteate. Lobes of perigonium 5, short-cornate at base, all winged in fruit. Staminodes 0. Stamens 5, inserted on a fleshy, lobed disk. Anthers appendaged, lanceolate. Style elongated, stigmas lanceolate. Utricle membranous. Tip of radicle superior — (Ours) shrubs, stem not jointed, leaves alternate.

1. N. spinosissima, L. ♄ *Shauk-el-Hanash. 'Athirr. Thirr, Dirr.* .2 to .5, glabrous, intricately branched from base; branches rigid, flexuous, *twigs spreading, bearing flowers from base to middle, spiny at tip.* Leaves alternate, semi-terete, filiform, mucronulate, the upper shorter. Floral leaves and bracteoles ovate at base, triquetrous-

subulate; flowers solitary in axils, often crowded at base of twig; wings of fruiting perigonium, obovate to oblong, longer than lobes — July to October — Subalpine and alpine Lebanon; Cœlesyria.

Var. **humilis**, Boiss. Densely tufted, hemispherical, .06 to .15 high — Alpine summits.

2. N. Tournefortii, Spach. ♄ .2 to .5, puberulent-scabrous, *unarmed*, branching at base; branches erect, elongated, simple or sparingly branched, *bearing flowers along their whole length.* Leaves linear-filiform, mucronulate, .02 to .04 long. Floral leaves as long as bracteoles or longer, oblong-lanceolate, keeled; flowers solitary, loosely spiked; wings of fruiting perigonium obovate-oblong, longer than lobes and bracteoles to twice as long — July to October — Kurd Dagh; Ṣôf Dagh; Akher Dagh.

21. ANABASIS, L. Anabasis.

Flowers perfect, bibracteate, solitary or rarely clustered. Leaves of perigonium free to base. Anthers not appendaged or minutely apiculate. Style divided to base into two, short, obtuse stigmas. Utricle membranous, sometimes berry-like. Tip of radicle inferior — Shrubs or herbs, with jointed stems, and opposite leaves, often reduced to scales.

1. A. articulata, Forsk. ♄ *Ushnân. Tarṭir. 'Ajram. Bel-bel.* .5 to 1 or more, with erect or tortuous, brittle branches. Leaves reduced to a short, bilobed cupule villous within. Flowers opposite, solitary, the upper crowded at tip of branches; staminodes orbicular-obovate, short-ciliolate; wings of fruiting perigonium 5, striate, ovate-orbicular, sinuate — September and October — Sandy places; Sinai and et-Tîh; near Damascus.

2. A. setifera, Moq. ♄ .3, stems numerous, erect or ascending, branches elongated. Leaves fleshy, horizontal, *cylindrical-club-shaped*, .008 to .01 long, .004 to .006 broad, *ending in a deciduous bristle.* Flowers 3-7 in a cluster in the upper axils, the lower clusters distant, the upper approximated; staminodes rounded-truncate, fimbriated; fruiting perigonium 5-winged, wings orbicular, nearly entire, somewhat unequal — Autumn — Jebel Usdum; el-'Arabah.

22. HALOCHARIS, Moq. Halocharis.

Flowers perfect, bibracteolate, solitary, axillary, spiked. Leaves of perigonium 5, free to base, membranous, unchanged in fruit. Staminodes 0. Stamens 5, filaments inserted on disk, cells of anther separate to tip, and there joined by a short connective, which is produced in a variously shaped vesicle. Style cleft to middle into subulate divisions. Radicle inferior, ascending — Annual herbs, stems not jointed, hispid with stiff, jointed bristles, and pubescent with short, crisp hair; leaves alternate, bristly toward tip.

H. sulphurea, Moq. ⊙ .3 to .4; stems erect, diffusely branched from base and above; flowering twigs .005 to .015 long. Leaves somewhat fleshy, linear, .01 to .014 long, somewhat triquetrous, obtuse, the primary soon withering, the floral oblong, scarcely as long as the lanceolate, keeled, densely hirsute bracteoles. Flowers in short,

imbricated spikes; the external two sepals very villous, the others glabrous; appendix of anthers sulphur-colored, oblong, obtuse, somewhat compressed, as long as cells, and broader -- July -- Salty sand, near the three altars in the Palmyrene Desert.

23. HALIMOCNEMIS, C. A. M. Halimocnemis.

Flowers perfect, bibracteolate, solitary in axils. Leaves of perigonium nerveless, 5, rarely 3-4, connate at base in a long excrescence, not appendaged. Stamens as many as leaves of perigonium, inserted at margin of disk, anthers with bladdery appendages. Branches of style elongated, obtuse, or fringed-truncate. Tip of radicle superior, elongated — Annual, fleshy herbs, stems not jointed, leaves (except the lowest) alternate, ending in a cartilaginous, usually deciduous cusp. Indument as in the last.

H. pilosa, Moq. ⊙ .2 to .4, canescent, branching from base, forming a spherical, intricate, little bush. Leaves semi-terete-triquetrous, .01 to .02 long, .0015 broad. Flowers rather remote, in upper axils; bracteoles somewhat shorter than floral leaf, ovate-lanceolate, shorter than perigonium, adnate to its base and deciduous with it, tapering into a prickle; leaves of fruiting perigonium 4, rounded at base, glabrous, lanceolate, cuspidate-acuminate, connivent into a cone; appendix of anthers pink, stipitate-club-shaped, longer and broader than cells — July — Palmyrene Desert, between Ain-el Beiḍa and el-Jebâh.

24. HALOGETON, C. A. Mey. Halogeton.

Flowers by abortion polygamous, clustered in the axils, stipitate in dense wool, the middle one bractless, the outer two with 2-3 bracteoles. Leaves of perigonium five, nearly free, or the outer two or three or all winged or gibbous at back. Staminodes 4-5, connate with filaments. Stamens 5 (rarely 3 or 2), anthers with a short appendage or 0. Ovary ovate, style short, stigmas 2, filiform. Radicle superior — Shrubs or annual herbs, with fleshy leaves.

Fig. 318.



Fruiting spike of Halogeton alopecuroides.

H. alopecuroides, Del. ♄ *El-Hamd*. Glabrous, much branched, low; branches spreading or curved, slender, white. Leaves scattered, distant, semiterete-club-shaped, flat above, convex below, fleshy, prickly-mucronate or muticous. Axils fleecy; flowers forming globular clusters in the axils, intermixed with orbicular-ovate bracts; flowering sepals hyaline, eroded-denticulate, in fruit the anterior and posterior, or three, or all, furnished with an ovate-fan-shaped wing above the middle, the wings usually unequal; stamens and staminodes 5 — Spring — Sinai; between Qosr-el-Kheir and 'Ain-el-Beiḍa (Syrian Desert)

ORDER LXXXIV. **PHYTOLACCACEÆ**, Endl.

(POKEWEED FAMILY).

Perennial herbs with alternate, entire leaves, and perfect or diœcious flowers, a petaloid, 4-5-parted calyx imbricated in the bud, stamens inserted on a disk at the bottom of the calyx, an ovary (in ours) composed of numerous, 1-ovuled cells, (ours) united in a ring, and forming a berry in fruit — Stamens as many as lobes of calyx, alternate with them, or more numerous, free or united at base in a cup. Ovule erect, implanted by base, (in ours) campylotropous. Styles as many as cells of ovary, simple. Radicle inferior. Albumen mealy, central, rarely 0.

FIG. 319.



(*a*) Branch of P. decandra, with leaves and flowers (one-third size). (*b*) Fruiting branch (one-third size). (*c*) A single flower (enlarged). (*d*) A ripe fruit (natural size). (*e*) Transverse section of same. (*f*) A seed magnified. (*g*) A transverse section of the same. (*h*) Vertical section of the same, showing the peripheral embryo and central albumen. (*i*) The embryo.

PHYTOLACCA, L. POKEWEED.

Flowers perfect or diœcious, tribracteate. Calyx 5-parted into petaloid, imbricated, equal lobes, reflexed in fruit. Stamens 5-25, filaments subulate, anthers 2-celled. Carpels 5-12, sessile in a hollow

torus, connate. Styles subulate, approximated in a crown but free, stigmatose along their inner face. Fruit a flattened berry, composed of indehiscent cells, with a fleshy pericarp. Seeds short-beaked, crustaceous. Albumen central, embryo annular, peripheral.

1. P. decandra, L. ♃ Pokeweed. Pigeon-berry. Garget. *Khuṭûṭ-el-Abâzah. Humrah. Sabghah.* 1 or more, *glabrous;* stem usually purplish. Leaves ovate to oblong-lanceolate, cuneate at base, short-petioled. Flowers *perfect;* racemes or peduncles longer than petioles, .1 to .15 long; stamens 10; berry 10-ribbed and 10-carpelled — Spring and summer — Ditches and roadsides to subalpine and alpine regions.

2. P. pruinosa, Fenzl. ♃ 1 or more, *pruinose, glaucescent.* Leaves fleshy, elliptical to elliptical-lanceolate, cuneate at base, nearly sessile. Flowers *diœcious;* racemes short-peduncled, .1 to .15 long; stamens 11-16; carpels and grooves 5-9 — July and August — Middle and subalpine zone of Amanus, and northward.

ORDER LXXXV. POLYGONACEÆ, Juss. (BUCKWHEAT FAMILY).

Herbs or shrubs with alternate leaves, and sheath-like stipules (ochreæ) above the swollen joints of the stem. Flowers perfect, or polygamous-monœcious, or diœcious, with a more or less persistent calyx, and a 1-celled ovary containing 1, erect ovule, and bearing 2-3 styles or stigmas — Perigonium inferior, 3-6-cleft, imbricated in bud. Stamens 4-16, inserted at base of calyx. Fruit indehiscent, nut-like, naked, or enclosed in inner divisions of calyx. Leaves generally entire.

* *Akenes 2-4-angled-winged. Embryo in axis.*

1. CALLIGONUM. ♄ Desert plants; leaves minute; flowers minute, axillary.
2. RHEUM. ♃ Coarse herbs; leaves orbicular, .2 to .8 broad; flowers in a large panicle.
3. OXYRIA. ♃ Tender alpine herbs; leaves cordate-orbicular to reniform, .01 to .015 broad; flowers in a spike-like raceme.

* * *Angles of akenes wingless. Embryo lateral or peripheral.*

4. EMEX. ⊙ Fruiting perigonium triquetrous-urceolate, 6-toothed, outer 3 teeth spinescent.
5. RUMEX. ⊙ ♃ Valves of fruiting perigonium 3, larger than outer 3, bract-like leaves, connivent.
6. ATRAPHAXIS. ♄ Fruiting perigonium 4-5-parted, the inner 2-3 leaves larger.
7. POLYGONUM. ⊙ ♃ ♄ Fruiting perigonium 4-5-fid or -parted, leaves nearly equal.

1. CALLIGONUM, L. CALLIGONUM.

Flowers perfect. Perigonium rotate, petaloid, not growing, lobes 5, plano-concave, spreading. Stamens 10-16, connate at base. Ovary 4-angled and -grooved; styles 4, free, short, stigmas capitate. Akene 4-winged, or else echinate especially at angles with 8-10 rows of branching, intertwined hairs, or covered with intertwined hairs expanded into a membrane enclosing the akene. Pericarp somewhat woody, seed 4-grooved. Embryo straight in axis of fleshy albumen — Much branched shrubs, the year old branches jointed, easily separated.

Ochreæ membranous, short-bilobed. Leaves usually minute, soon deciduous. Flowers few, clustered in the axils of the ochreæ, on jointed pedicels.

1. C. comosum, L'her. ♄ *Rosah. Risu. Arṭâ.* 3 to 5, glabrous; branches white, tortuous. Leaves hardly .002 long, subulate, *adnate to ochreæ.* Akene ovate, bristles in 12-16 rows, branching, *soft*, dilated at base, more or less joined into 4, short wings — April — Syria; Ghor-es-Sâfieh to Sinai and Egypt.

2. C. polygonoides, L. ♄ 3 to 5, glabrous; branches slender. Leaves .006 to .01 long, subulate, *free from ochreæ*, soon deciduous. Akene oblong, bristles *rigid*, branching, dilated at base, more or less joined in short wings — Spring — Southern and eastern Deserts (Tristram).

2. RHEUM, L. Rhubarb. *Rîbâs.*

Flowers perfect. Perigonium herbaceous, 6-parted, marcescent, with nearly equal lobes. Stamens 9, inserted at bottom of calyx. Ovary free, triquetrous, styles 3, short, spreading, stigmas entire, discoid. Akene samaroid, 3-winged-angled, much longer than appressed perigonium. Seed erect, embryo straight in axis of mealy albumen, radicle short, superior — Coarse herbs, with a thick rhizome, thick, short, annual stems, and broad, palminerved leaves.

R. Ribes, Gronov. ♃ *Rîbâs.* 1 or more, stem leafy below, leafless above, ending in a broad, clustered panicle. Leaves glaucescent, leathery, cordate-orbicular to reniform, .2 to .8 broad, denticulate, coarse-nerved, nerves papillose below. Pedicels clustered, filiform; akene crimson, somewhat fleshy, cordate-ovate, .01 to .015 long, wings 2-3 times as broad as seed — May — Moab; subalpine and alpine Lebanon; Amanus, and northward, and eastward.

3. OXYRIA, Hill. Mountain-Sorrel.

Flowers perfect. Perigonium herbaceous, 4-parted, marcescent, the inner pair of sepals broader, at length appressed to akene, the outer pair reflexed. Stamens 6, a pair opposite each outer sepal, and a single one opposite each inner. Ovary compressed, stigmas two, nearly sessile, penicillate. Akene lenticular, membranous, surrounded by a broad, translucent wing. Seed compressed, erect. Embryo in axis of mealy albumen, radicle straight, superior — Tender, low, alpine herbs.

O. digyna, L. ♃ .01 to .035; neck much branched, scaly from old ochreæ and petioles; stems nearly leafless, ending in a simple raceme or meagre panicle. Leaves cordate-orbicular to reniform, .01 to .025 broad, long-petioled, sometimes obsoletely 3-lobed. Pedicels filiform, jointed about middle, somewhat longer than fruit; akene orbicular, cordate at base, .003 long, more or less incised at tip, wing purple, transversely veined, as broad as seed or broader — Late summer — Alpine Lebanon.

4. EMEX, Neck. Emex.

Flower monœcious - polygamous. *Staminate.* Perigonium herbaceous, 3-6-parted, lobes equal, spreading. Stamens 4-6. *Pistillate.*

Perigonium herbaceous, triangular-urn-shaped, 6-toothed, the outer three teeth at length spinescent, spreading, the inner connivent. Ovary triquetrous, with a basilar, erect ovule, and three, penicillate stigmas. Akene free, enclosed in calyx-tube. Seed erect, turbinate-triquetrous. Embryo peripheral around mealy albumen, cotyledons leafy, radicle superior — Annual, forked herbs, with truncate, torn, membranous ochreæ, and green flowers in axillary, leafless racemes or clusters, the lower pistillate nearly sessile, the upper perfect or staminate, on filiform pedicels.

E. spinosus, L. ⊙ *Fijl-el-Jebel. Ḥanzab. 'Shajaret-el-'Ajûz. Raqbet-el-'Ajûz. Dirs-el-'Ajûz. Kulleih. Ḥummeir. Ḥummeiḍ. Tablâlast.* .2 to .5, glabrous, usually many-stemmed from neck, the lateral stems often decumbent. Leaves petioled, entire, cordate or truncate at base, ovate to ovate-oblong. Inner teeth of fruiting calyx ovate-triangular, 3-ribbed, the outer spinescent, usually recurved — October to April — Sandy places and fields; common.

5. RUMEX, L. Sorrel. *Ḥammâḍ.*

Flowers perfect, or polygamous, or diœcious. Perigonium herbaceous, 6-parted, inferior, persistent, the inner divisions (valves) often growing after flowering, connivent, closely embracing the fruit; the outer small, spreading or reflexed, rarely erect. Stamens 6. Ovary free. Styles 3, thread-like; stigmas tufted — Herbs, with alternate leaves sheathing at base, and whorled flowers forming leafy or leafless panicles or racemes.

* *Valves growing in fruit.*

† *Midrib of one or more of the leathery valves with a warty protuberance at base or to middle. Styles free. Flowers perfect or polygamous.*

‡ *Perennials.*

§ *Valves entire or somewhat repand.*

1 R. Orientalis, 2 crispus, 3 conglomeratus, 4 nemorosus.

§ § *Valves serrated to incised-dentate or aculeate.*

5 R. obtusifolios, 6 Nepalensis.

‡ ‡ *Monocarpics. Valves dentate or aculeate.*

7 R. pulcher, 8 Cassius, 9 dentatus, 10 bucephalophorus.

† † *Midrib of membranous valves often thickened into a deflexed scale at base, margins entire. Flowers diœcious, rarely perfect-polygamous.*

‡ *Perennials.*

11 R. scutatus, 12 tuberosus.

‡ ‡ *Annuals.*

13 R. lacerus, 14 vesicarius, 15 roseus.

* * *Valves unchanged in fruit, appressed to akenes, not membranous. Styles adnate to angles of ovary. Annuals.*

16 acetoselloides.

1. R. Orientalis, Bernh. ♃ 1 or more; stem stout, ending in a nearly leafless, dense panicle. Leaves peduncled, more or less cordate at base, oblong, the lowest .3 to .4 long, .06 to .08 broad, the upper-

most oblong to lanceolate, sessile, cuneate at base. Racemes sessile, *dense; whorls rather indistinct;* pedicels about as long as valves, jointed below middle; valves .006 long, cordate-ovate, obtuse, reticulate, entire or repand-denticulate, one bearing a small, prominent wart — June and July — Subalpine Lebanon; Akher Dagh, and northward.

2. R. crispus, L. ♃ 1 to 1.5, stem grooved, branching almost from base, ending in a *long, narrow, leafy* panicle. Leaves *wavy*, the radical long-petioled, *tapering at base*, lanceolate, .2 to .4 long, .02 to .05 broad, acutish or obtuse, the upper and floral *linear-lanceolate to linear.* Whorls *approximated;* pedicels jointed below middle; valves .003 long, round-ovate, somewhat cordate, the outer or all bearing a small wart — May to August — Beirût; Lebanon and Cœlesyria to Aintâb, and northward.

Var. **elongatus**, Boiss. Leaves narrower, scarcely wavy-margined. Valves ovate to oblong.

3. R. conglomeratus, Murr. ♃ .6 to 1; stem panicled from a little above base, panicle leafy, *with spreading branches.* Leaves entire or repand, the lower petioled, oblong to oblong-lanceolate, .1 to .2 long, round or subcordate at base, the upper sessile, lanceolate to linear, acuminate. Whorls *distant;* pedicels about as long as valves, jointed below middle; valves *oblong*, .002 long, entire, *each bearing a wart more than half as long as itself* — Summer — Wet fields; coast and lower mountains, and interior plains.

4. R. nemorosus, Schrad. ♃. 6 to 1; stem grooved, slender, erect, ending above in a panicle; branches of panicle leafy only at base, or leafless. Leaves entire, the lower petioled, cordate-oblong, .05 to .15 long, .02 to .05 broad, the upper lanceolate-linear. Whorls distant; pedicels *shorter* than valves, jointed near base; valves linear-oblong, *obtuse*, 002 long, *one only bearing a wart* — May — Beirût.

5. R. obtusifolius, L. ♃ .5 to 1, panicled from near base, naked above. Leaves obsoletely repand-lobed, the lower ovate-cordate to oblong, obtuse, the upper lanceolate, tapering at both ends. Whorls rather remote; pedicels elongated, jointed below middle; valves *ovate-triangular*, .005 long, *dentate near base, ending in an oblong, obtuse, entire apex, all warty* — Summer — Roadsides; Gaza; Lebanon; Ḥaurân; Damascus; Aintâb, and northward, and eastward.

6. R. Nepalensis, Spreng. ♃ 1 or more; root-fibres napiform, thick. Leaves oblong, the lower cordate at base, the upper cuneate-lanceolate, nearly sessile. Panicle few-branched, open; racemes nearly naked; whorls remote; pedicels jointed below middle, nearly as long as calyx; valves *ovate-orbicular*, .006 long, reticulate, *margin beset with subulate, hooked spines, as long as breadth of valve,* one or more of the valves warty — May and June — Middle and upper Lebanon.

7. R. pulcher, L. ② .5 to 1, glabrous or rough; stem erect, paniculate. Leaves small, the lower petioled, subcordate at base, ovate to oblong or fiddle-shaped, the upper lanceolate. Racemes open, elongated; whorls remote, *subtended by a linear-lanceolate leaf;* pedicels short, jointed near the base, nodding; valves *ovate-oblong*, .004 long, *with* 5-6, *stiff, straight teeth* on either side, *shorter than the diameter of the valve;*

warts unequal in size — Spring — Common everywhere below subalpine regions.

8. R. Cassius, Boiss. ⊙ .5 to 1; root-stock thick, short; stems erect, nearly simple. Leaves small, the radicle petioled, ovate-oblong, subcordate or rounded at base, obtuse, the upper oblong-lanceolate, acute. Raceme long, leafy below, naked above; whorls distant; pedicels thickened, *shorter* than fruit, jointed near base; valves reticulate, coriaceous, *triangular-deltoid, acute,* with 3-5, subulate, hooked spines on each side, entire at tip, all unequally warty — Summer — Mount Cassius.

9. R. dentatus, L. ⊙ .3 to .6; stem erect, simple or branching from base. Lower leaves petioled, rounded or subcordate at base, oblong, sometimes fiddle-shaped, obtuse, somewhat wavy. Whorls distinct, or more or less confluent, subtended by a linear-lanceolate, short, petioled leaf, with cuneate base; pedicels shorter than fruit; valves *oblong-lanceolate,* .004 long, reticulate, all with a usually large wart, and with 1-3, *subulate, straight teeth on either side, as long as the width of the ovule* — Spring — Wet places in Jordan Valley.

10. R. bucephalophorus, L. ⊙ .1 to .3; stem simple or branching from neck, erect or ascending, ending in long, *simple, slender racemes.* Leaves petioled, the lower ovate-spathulate to oblong-lanceolate, the upper linear. Whorls somewhat approximated, 2-3-flowered; pedicels jointed at base, *at length club-shaped, reflexed,* longer than perigonium; valves with a minute wart at deltoid base, oblong-lanceolate, with 2-4, spiny, straight or hooked teeth on either side toward base, entire toward apex — March to June — Fields; coast and lower mountains; common.

11. R. scutatus, L. ♃ .4 to .5, glabrous or papillose, glaucescent; root-stock creeping; stems numerous, ascending, flexuous, forked, ending in long, loose racemes. Leaves fleshy, the lower long-petioled, cordate-ovate, obtuse, the intermediate and upper *hastate-fiddle-shaped or trilobed,* with a deep, *excavated sinus, the middle lobe rhombic-ovate, broader than long, the lateral narrow, acute.* Whorls 2-4-flowered, remote; pedicels filiform, jointed toward middle; valves membranous, cordate-orbicular, .007 long, not warty, and scarcely reticulated — Summer — On shingle; Marash, and northward.

12. R. tuberosus, L. ♃ .3 to .5, green, glabrous; root-fibres spindle-shaped; stem sparingly leafy, naked-panicled above. Root-leaves long-petioled, *ovate to oblong,* blade .04 to .05 long, rounded or cordate or *cordate-hastate at base,* with short, diverging, acute or obtuse auricles; *upper sessile, hastate, lanceolate to linear,* pedicels jointed about middle; valves ovate-orbicular, .006 long, reticulate, cordate or truncate at base, longer and broader than akene, with or sometimes without a deflexed scale at base, — May to July — Ḥaurân; Aleppo; Aintâb, and northward.

13. R. lacerus, Balb. ⊙ *Ḥamṣîṣ. Fistuq-el-'ushreh.* .1 to .4, glabrous, branching from neck; branches decumbent and ascending, forked. Leaves fleshy, petioled, ovate-oblong in outline, .02 to .04 long, *pinnatifid or -parted* on either side into 1-4, ovate-triangular to oblong-linear, lateral lobes, *the terminal oblong-triangular, crenate-lobed or dentate,* obtuse or acute, the uppermost leaves lanceolate-linear, repand

to entire. Racemes axillary and terminal, leafless, loose; pedicels capillary; valves membranous, reticulate, reniform to cordate-ovate, .005 to .01 long, often deep red; scale oblong — Spring — Sands; coast and southern deserts.

14. R. vesicarius, L. ⊙ *Hanbeit. Hammad. Hummeid.* .1 to .3, glabrous, branching from neck. Leaves *subcordate or subhastate at base, ovate to deltoid.* Racemes simple or panicled; flowers often twin; valves cordate-ovate, .015 long, membranous, reticulated, margin (in type) *not bordered by a nerve* — Spring — Sands and rocks of coast; and southern deserts; Tiberias; Dead Sea.

15. R. roseus, L. ⊙ would seem to be a variety of the foregoing species with *oblong-deltoid to lanceolate leaves,* and *valves bordered by a nerve* —Judean Desert; Galilee; Sinai; Damascus.

16. R. acetoselloides, Ball. ♃ .3 to .5; stems erect or ascending, ending in a flexuous panicle. Leaves petioled, *hastate-tripartite,* the middle lobe oblong-lanceolate, larger than the linear, undivided or more or less parted lateral lobes. Whorls few-flowered, loose; flowers .0015 long; valves ovate, obtuse, appressed to fruit but free from it, thrice as long as outer leaves of perigonium — Summer — Old fields and sandy places; Lebanon; Amanus; Akher Dagh, and northward.

6. ATRAPHAXIS, L. Atraphaxis.

Flowers perfect. Perigonium petaloid, 4-5-parted, leaves imbricated, the outer unchanged, the inner growing in fruit, appressed to akene. Stamens 6-8, filaments dilated at base, inserted at bottom of perigonium. Styles 2-3. Ovary lenticular or triquetrous, with crustaceous pericarp. Seed filling the cell, of the same shape, erect. Embryo incumbent in angle of albumen, radicle superior, cotyledons linear — Shrubs, often spinescent.

* * *Perigonium* 4-*merous. Stamens* 6. *Stigmas* 2. *Akene lenticular.*

1. A. spinosa, L. ♄ .3 to .5. Leaves elliptical-rhombic to cordate-orbicular, .005 to .003 long. Outer two leaves of perigonium ovate-orbicular, reflexed, inner two cordate- to reniform-orbicular, .005 long — May and June.

Var. **typica,** Boiss. Greenish. Leaves elliptical to oblong — Aintâb, and northward.

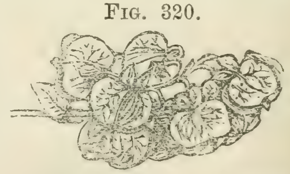
Var. **glauca,** Boiss. Glaucous. Leaves ovate to oblong — Syrian Desert.

Var. **Sinaica,** Boiss. *Suweid. Sawâs.* Leaves .003 to .004 long, round-ovate — Sinai.

* * *Perigonium* 5-*merous. Stamens* 8. *Stigmas* 3. *Akene triquetrous.*

2. A. Billardieri, Jaub. et Sp. ♄ .3 to .5. Leaves ovate to oblong, obtuse and acute, .003 to .007 long. Outer two leaves of perigonium ovate, deflexed, inner 3-2, cordate-reniform, .01 broad — Summer — Subalpine and alpine Lebanon and Antilebanon, and Damascus plateau.

Fig. 320.



Fruiting raceme of Atraphaxis Billardieri.

Var. **heterantha,** Boiss. Some of the flowers (often in the same receme), 4-merous, with flat akene, others 5-merous, with triquetrous akene — Same range as last; also Aintâb and Ṣof Dagh.

7. POLYGONUM, L. Knotweed.

Flowers perfect. Perigonium 4-5-cleft or -parted, herbaceous or petaloid, persistent, enclosing the fruit. Stamens 4-8, in two rows, inserted at base of perigonium. Styles or stigmas 2-3. Akene triangular or lenticular, crustaceous, with erect seed. Embryo accumbent to angle of albumen, or curved and somewhat immersed, with leafy cotyledons and superior radicle — Annual or perennial herbs or shrubs, with the base of the petiole expanded into a membranous, tubular sheath (*ochreæ*), and membranous, interfloral bracts (*ochreoles*).

Fig. 321.



(*a*) Tip of a flowering branch of a Polygonum, showing the ochreæ, leaves, and spikes of flowers. (*b*) A single flower, showing the 4 lobes of perigonium with stamens inserted at their base, and the free ovary with two styles, connate at base. (*c*) Vertical section of ovary, showing the erect ovule. (*d*) Vertical section of seed, showing the lateral embryo.

* *Spike* 1, *at tip of simple stem. Styles* 3, *free, with small stigmas. Stamens* 5-8. *Ochreæ oblique, not ciliate.*

1 P. Bistorta.

* * *Stems usually branching, spikes at end of branches. Styles* 2-3, *more or less connate. Stamens* 8-4, *with alternate scales. Ochreæ cylindrical, usually ciliate.*

† *Perennials. Flowers in* 2 *pentandrous, in* 3 *hexandrous.*

2 P. amphibium, 3 serrulatum.

† † *Annuals. Flowers hexandrous.*

4 P. Hydropiper, 5 Pesicaria, 9 lapathifolium.

* * * *Stems climbing. Flowers* 3-6, *clustered in axils. Stamens* 8, *stigmas nearly sessile. Leaves cordate-sagittate.*

7 P. Convulvulus, 8 dumetorum.

* * * * *Flowers clustered in the axils, or solitary, forming leafy or leafless spikes. Stamens* 8-5, *the inner* 3 *filaments ovate at base. Ochreoles cup-shaped.*

† *Annuals.*

‡ *Ochreæ pellucid, undivided, at length more or less fringed-toothed.*

9 P. polycnemoides.

‡ ‡ *Ochreæ brownish at base, pellucid, bifid, at length fringed.*

10 P. Bellardi, 11 pulchellum, 12 aviculare.

† † *Perennials with more or less herbaceous stems.*

‡ *Ochreæ bifid, usually many-nerved.*

13 P. equisetiforme, 14 maritimum, 15 Aleppicum.

‡ ‡ *Ochreæ undivided, but at length fringed at tip,* 2-*few-nerved.*

16 P. alpestre, 17 herniarioides.

† † † *Perennials, with shrubby base, and rigid branches.*

‡ *Ochreæ bifid, many-nerved, at length fimbriated.*

18 P. setosum, 19 luzuloides.

‡ ‡ *Ochreæ undivided, at length fimbriated.*

20 P. Libani.

1. P. Bistorta, L. ♃ Bistort. .3 to .8 ; root-stock thick, twisted; stem simple. Leaves glaucescent-puberulent at under surface, revolute-margined, the lower ovate-oblong, truncate or cordate at base, .1 to .2 long, borne on a long petiole which is winged toward tip, the upper much smaller, lanceolate, clasping at base; ochreæ long, brown. Spike dense, oblong, .03 to .05 long, .01 broad; ochreoles ovate, subulate; perigonium pink; stamens exserted—June—Alpine Lebanon (Tristram).

2. P. amphibium, L. ♃ Water Persicaria. Root-stock creeping. Leaves oblong to oblong-lanceolate, .1 to .15 long. Spikes terminal, long-peduncled, oblong, .015 to .03 long; ochreoles ovate, acute; flowers 5-androus, pink – Summer — Lebanon.

Var. **aquaticum,** Willd. Floating; ochreæ not ciliate; floating leaves long-petioled.

Var. **terrestre**, Willd. Stem erect; ochreæ *ciliate;* leaves nearly sessile, lanceolate, narrower and more acute, sometimes appressed-scabrous.

3. P. serrulatum, Lag. ♃ .5 or more; stems prostrate, rooting below, then ascending, branching. Ochreæ appressed-bristly, *the margin furnished with ciliæ, often as long as sheath;* leaves nearly sessile, rounded or subcordate at base, linear-lanceolate, *appressed-ciliate at*

margin. Spikes loose, filiform, erect; perigonium pink, glandless; ochreoles *densely ciliate* — Late summer and autumn — Ditches; coast and lower mountains; Aintâb.

Var. **salicifolium,** Boiss. Leaves broader and shorter. Ciliæ of ochreæ and ochreoles short.

4. P. Hydropiper, L. ⊙ Smartweed. Water Pepper. .5 to .8, *acrid;* stems erect or ascending, branched. Ochreæ short, *short-ciliate;* leaves oblong-lanceolate to lanceolate, glabrous or scabridulous at nerve. Spikes loose, filiform, pendulous; perigonium *purplish-green; glandular-punctate; ochreoles unarmed* — Spring and summer — Ditches; coast and lower mountains.

5. P. Persicaria, L. ⊙ Lady's Thumb. .3 to .8; stems erect or ascending, simple or stiff-branched. Ochreæ *ciliate;* leaves *oblong-elliptical* to lanceolate, sparingly hairy to glabrescent. Spikes peduncled or sessile, oblong-cylindrical, dense, rather erect; perigonium greenish-purple, *destitute of glands; ochreoles ciliate* — Spring and summer — Ditches and wet places; common.

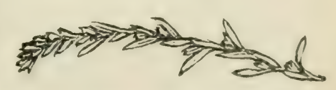
6. P. lapathifolium, L. ⊙ *Ḥummeiḍah.* .3 to .8; stems erect, branching. Ochreæ truncate, *sparingly short-ciliate;* leaves tapering at base, *ovate-elliptical* to lanceolate, *ciliate at margin.* Spikes oblong-cylindrical to cylindrical, dense, erect or somewhat nodding; *pedicels and greenish-white or reddish perigonium more or less glandular; ochreoles not ciliate* — Summer and autumn — Ditches; common.

7. P. Convolvulus, L. ⊙ Black Bindweed. Stems climbing. Leaves cordate-sagittate. Flowers 3-6, clustered in axils. Outer lobes of perigonium *somewhat keeled* — May to September — Fields; coast and lower mountains of coast range; Antioch.

8. P. dumetorum, L. ⊙ Climbing False Buckwheat. Stems climbing. Leaves cordate-sagittate. Flowers 3-6, clustered in axils. Outer lobes of perigonium *membranous-winged* — July to September — Amanus.

9. P. polycnemoides, J. et Sp. ⊙ .2 to .5, glabrous, *prostrate, many-stemmed from base;* stems slender, *flaccid. Leaves* .005 to .01 long, *linear to subulate.* Flowers 1-2 in axils, short-pedicelled, forming long, slender, leafy spikes; perigonium greenish-white; akene minutely dotted — Summer — Gravelly and sandy places; subalpine Lebanon and Antilebanon, plain of Damascus, and eastward, and northward.

Fig. 322.



Tip of flowering branch of Polygonum polycnemoides.

10. P. Bellardi, All. ⊙ .3 to .5, glabrous, *erect,* paniculate. Leaves elliptical to lanceolate, .01 to .04 long. Flowers 2-3 in a cluster, with *pedicels as long as perigonium or longer,* forming *long, slender, interrupted, naked spikes;* perigonium *green with reddish margins;* akene *minutely-dotted,* somewhat glossy — May to September — Common throughout.

11. P. pulchellum, Lois. ⊙ .2 to .5, branching from base, branches decumbent to prostrate. Leaves elliptical to oblanceolate and lanceolate, .005 to .01 long. Flowers 1-2, in slender, rather loose spikes, with pedicels usually longer than perigonium; perigonium *pinkish-white;* akene minutely wrinkled, somewhat glossy — Autumn — Amanus.

12. P. aviculare, L. ⊙ .3 to .6, branching from base, sometimes becoming perennial; branches prostrate or procumbent, rarely erect, *leafy along their whole length.* Leaves elliptical to oblong and lanceolate, .01 to .02 long. Flowers 3-5, *on very short pedicels;* perigonium greenish or reddish; akenes wrinkled-striate, slightly glossy — Spring and summer — Fields and roadsides; common.

Var. **littorale**, Boiss. Branches thicker. Leaves more fleshy — Coast.

13. P. equisetiforme, Sibth. et Sm. ♃ .5 to .8; stems prostrate or decumbent. Leaves oblong to oblong-lanceolate, .005 to .035 long, acute, *margin rather wavy*, the floral linear, *as long as flowers or a little longer*, Flowers 2-3 in a cluster, in long, terminal, loose or dense racemes; pedicels about as long as perigonium or longer; akene glossy — May to November — Common to subalpine regions, and in Jordan Valley.

14. P. maritimum, L. ♃ Coarse Knotgrass. .3 to .8, procumbent, *leafy throughout.* Leaves glaucous, *elliptical*, .006 to .02 long, veiny, *revolute-margined, the floral little smaller than others, much longer than flowers.* Flowers 1-3, *short-pedicelled;* akene glossy — Summer and autumn — Along coast; Zahleh.

15. P. Aleppicum, Boiss. et Haussk. ♃ .06 to .1, glabrous, decumbent, slender, simple or densely branched. Leaves *linear-elliptical*, .004 to .007 long, short-petioled, many-nerved at lower surface, the *floral shorter than flowers.* Flowers 3-4 together, *with long, articulated pedicels*, salver-shaped, the green tube longer than white lobes; akenes * * — Summer — Roadsides near Aleppo.

16. P. alpestre, C. A. Mey. ♃ .3 to .4, glabrous; root-stock more or less thickened; stems scaly, prostrate, densely leafy. Leaves rather fleshy, oblong to elliptical, .02 to .03 long, tapering to a short petiole, short-cuspidate or mucronate, with scabridulous margin, the floral nearly as large. Flowers 5-8 from most of the axils, short-pedicelled, funnel-shaped, in fruit triquetrous; akene .002 long, smooth — May to September — Subalpine to alpine Lebanon, Antilebanon, Hermon and Haurân to Aleppo, Aintâb, and northward.

Fig. 323.



Tip of branch of Polygonum alpestre.

17. P. herniarioides, Del. ♃ .2 to .3, prostrate, branching from base, leafy to end of branches; internodes short. Leaves *oblong to linear-spathulate*, .006 to .01 long, somewhat fleshy, *nerveless*, as

long as or longer than internodes. Flowers 3-6 in axils, *greenish*, short-pedicelled; akenes .001 long, glossy — Summer — Coast.

18. P. setosum, Jacq. ♃ .2 to .5, glabrous, many stemmed; stems stiff, erect or ascending, striate, ending in simple, or sparingly panicled racemes. Leaves as long as internodes, or longer, .01 to .025 long, .002 broad, linear - lanceolate, somewhat revolute-margined, parallel-nerved, the floral much shorter. Flowers 1-3 in a cluster, *short-pedicelled*, forming long, slender racemes, pinkish-white; akene ovate, glossy — August and September — Akher Dagh.

Fig. 324.



(*a*) Leaf and sheath of Polygonum setosum. (*b*) Tip of flowering branch of same.

Var. **restionoides,** Boiss. Leaves less than .001 broad; floral leaves shorter than flowers — Gaiour Dagh (Amanus).

19. P. luzuloides, Jaub. et Spach. ♃ .4 to .5, glabrous; stems often creeping, rooting; branches erect, striate, rigid, stiff-panicled. Leaves linear - lanceolate, the lower .02 to .05 long, often .008 broad, somewhat revolute - margined, parallel-nerved, the floral shorter than flower. Flowers 2-4 in a cluster, with *pedicel as long as perigonium*, forming long, slender racemes; perigonium pinkish-white; akene oblong, glossy — August and September — Akher Dagh, and northward. Seemingly only a broad-leaved, long-pedicelled variety of the last.

20. P. Libani, Boiss. ♃ .1 to .2, glabrous; new stems ascending or procumbent, naked below, densely leafy above. Leaves oblong-elliptical, .005 to .01 long, *with deciduous mucro, many-nerved at lower* surface, the floral longer than the flowers. Flowers *flesh-covered* 1-3 in axils, nearly sessile or short-pedicelled, *forming short, terminal, dense, leafy spikes;* akene smooth, glossy — Summer — Alpine and subalpine Lebanon; Cœlesyria; Hermon.

Order LXXXVI. CYTINACEÆ, Lindl. (Cytinus Family.)

Parasitic herbs, with scaly, leafless stems, monœcious or diœcious (rarely perfect) flowers, the perigonium more or less adherent to the 1-*celled, many-ovuled ovary, the fruit a many-seeded berry, the embryo imbedded in cellulose albumen* — Lobes of calyx (in ours) imbricated. Anthers numerous, affixed to a central column, 1-2-celled. Placentæ parietal. Ovules orthotropous or anatropous.

CYTINUS, L. Cytinus.

Perigonium tubular-campanulate, lobes 4-8, imbricated in the bud, *Staminate flowers.* Bracts 2, at base of perigonium, rarely 0. Anthers 8-10, sessile at tip of central column, in 1 row, connate in a head, 2-celled, extrorse. *Pistillate flowers.* Bracts 2, near middle of ovary, adnate to it, or 0. Ovary inferior, 1-celled, with parietal placentæ.

Style cylindrical, stigma globular, ovules orthotropous. Fruit a pulpy, 1-celled, indehiscent, many-seeded berry; seeds minute — Herbs, parasitic on roots (in ours) of Cistus, with short, fleshy stems, beset with imbricated scales.

C. **Hypocistis,** L. ♃ .05 to .15, monœcious; stems cylindrical-club-shaped, solitary or numerous. Scales pink to crimson, ovate to elliptical, obtuse, denticulate-ciliate. Flowers subsessile, 5-10 in short, spike-like heads, the pistillate lateral, the staminate central; bracts 2; calyx white or yellowish, pubescent, the 4 lobes ovate-elliptical, erect; anthers 8; stigma capitate, 8-10-grooved — May and June — On roots of species of Cistus; coast and lower mountains.

ORDER LXXXVII. ARISTOLOCHIACEÆ, Lindl.

(BIRTHWORT FAMILY.)

Herbs, with perfect flowers, the lurid, conspicuous perigonium superior, (in ours) irregular, undivided, the ovary 6-celled, forming a capsule; the anthers longitudinally dehiscent — Stamens (in ours) 6, adnate to style; placentæ central, many-ovuled, ovules anatropous, with thickened raphe; embryo small, at base of fleshy albumen. Leaves heart-shaped at base, entire, alternate — A family of tonic, stimulant plants.

ARISTOLOCHIA, L. BIRTHWORT.

Perigonium tubular, dilated above ovary, the apex generally ligulate. Style short, with 6 stigmas. Ovules in two rows on the placenta. Capsule leathery, umbilicate at tip with the scar of the limb of the perigonium, septicidal, 6-valved at base or toward apex. Seeds in one row, strophiolate — Herbs, sometimes climbing.

* *Limb of perigonium not auricled at base.*

† *Stems climbing. Tube of perigonium curved.*

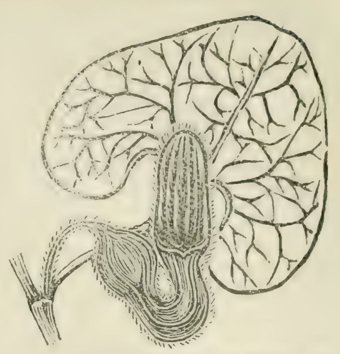
1. A. altissima, Desf. ♃ 3 to 5; root fibrous; stem 6-angled, *often as thick as a finger.* Leaves persistent, glossy, glabrous, short-petioled, cordate-ovate, acute or obtusish, .03 to .08 long, auricles rounded. Peduncles thrice as long as petiole; flowers solitary, .02 to .03 long, rusty-purple, with globular utricle, curved tube, and ovate or oblong lip, much shorter than tube; capsule *oblong*, .025 to .03 long, .015 to .018 broad, pendulous — April and May — Rocky and shady places; Phœnician coast, Lebanon, and Antilebanon.

† † *Stems not climbing. Tube of perigonium straight or strongly incurved.*

2. A. parvifolia, S. et Sm. ♃ .1 to .25; root-stock fusiform; stems .001 thick, procumbent or ascending, leafy. Leaves .01 to .015 long, short-petioled, puberulent at lower surface, cordate-ovate, with somewhat 4-angled sinus, and rounded auricles. Flowers dusky-purple, very short-peduncled, solitary in upper axils; utricle ovate, tube .01 to .015 long, *lip linear-lanceolate*, .03 long; capsule *spherical*, .01 in diameter — May and June — Phœnician plain; Jerusalem; Lebanon to 1300 m.; Amanus.

3. A. Billardieri, J. et Sp. ♃ .3; stems erect, slender, puberulent. Leaves short-petioled, papillose-hispid on both sides, .02 to .03 long, cordate-ovate, obtuse, with excised sinus. Flowers *violet*, .02 to .03 long, short-peduncled, solitary in axils; utricle hispid, shorter than peduncle, lip oblong-linguiform, as long as *strongly incurved* tube; capsule pyriform, .015 long — May and June — 'Ain el Beida, between Alexandretta and Aleppo.

Fig. 325.



Leaf and flower of Aristolochia Billardieri.

* * *Perigonium expanded above and behind into a 1-sided limb, which is cordate-2-auricled at base. Tube strongly incurved.*

4. A. Maurorum, L. ♃ .2 to .5, hirtellous; trunk-oblong to cylindrical; stems naked below, simple or branched. Leaves *short-petioled, lanceolate to linear*, hastate, acute, deeply excavated at base, with *oblong-spathulate*, obtuse auricles. Flowers on a long, nodding peduncle, solitary in axils, hirtulous, .04 to .06 long, rusty-colored, with yellow spots; utricle ovate, .005 to .015 long, lip .015 to .03 long; capsule obovate, .03 to .05 long, .02 to .03 broad — April to July — Hedges; not uncommon.

Fig. 326.



Leaf and flower of Aristolochia Maurorum.

Var. **latifolia**, Boiss. Leaves triangular-hastate, .03 broad at base or more — Jerusalem; Gilead.

5. A. pæcilantha, Boiss. ♃ .2 to .5, hirtellous; trunk oblong to cylindrical; stems naked below, simple or branched. Leaves *long- or short-petioled, triangular-hastate to ovate*, deeply excavated at base, with obtuse, *recurved* auricles. Flowers on a long, nodding peduncle, solitary in axils, .04 to .1 long, hirsute without, *glabrous within*, greenish-yellow, with blackish-purple spots near throat; utricle ovate, .005 to .015 long, lip .015 to .03 long; capsule oblong-obovate, .03 to .05 long — May to July — Shady and rocky places; common. Probably only a variety of the last.

Order LXXXVIII. **LAURINEÆ**, D.C. (Laurel Family.)

Aromatic trees or shrubs, with simple, alternate leaves, (ours with) diœcious flowers, the perigonium free, (ours) of 4 sepals, imbricate in the bud, and a 1-celled, 1-ovuled ovary, forming a berry or drupe in fruit; anthers opening by

uplifted valves — Flower perfect or diœcious. Perigonium 4-6-fid or -parted. Stamens inserted at the margin of a perigynous disk, as many as sepals and opposite to them, or 2-6 times as many, arranged in rows. Anthers adnate to filament, introrse or extrorse, 2-4-celled. Ovule pendulous, anatropous. Style 1. Embryo orthotropous. Albumen 0.

LAURUS, L. LAUREL. BAY TREE. *Ghâr.*

Flowers diœcious, umbelled, sheathed by hooded, deciduous bracts. Perigonium 4-parted, the divisions deciduous. *Staminate flowers.* Stamens 8-12, in 2-3 rows, the filaments with two glands about middle. Anthers introrse, oblong, 2-celled, connective broad. *Pistillate flowers.* Stamens 4, sterile, the filaments with a shield-shaped gland on either side at tip. Ovary with 1, pendulous ovule. Style single, stigma obtuse. Fruit a 1-seeded berry, borne on the truncate base of the perigonium. Seed ascending on a funicle from the base of the fruit, and adnate to the testa above, pendulous. Albumen 0. Cotyledons large, oleaginous, radicle included, superior — Evergreen shrubs with alternate leaves.

L. nobilis, L. ♄. Laurel. Bay Tree. *Ghâr.* 3 to 6, glabrous. Leaves short-petioled, glossy at upper surface, paler at lower, coriaceous, oblong to lanceolate, acute or obtuse, somewhat wavy-margined. Staminate flowers in lateral or terminal umbels or often in dense, many-flowered cymes; pistillate in few, branched, lateral, axillary umbels or small cymes; scales of involucre glabrescent; sepals obovate, obtuse; drupe elliptical, as large as an Isabella grape, black — April to June — Thickets and woods; coast to middle mountain zone.

ORDER LXXXIX. THYMELÆACEÆ, Meissn.
(MEZEREUM FAMILY.)

Shrubs or herbs, with entire leaves, perfect or polygamous-diœcious flowers, a regular, 4-cleft perigonium, with lobes imbricated in the bud, 8 stamens, and a free, 1-celled, 1-ovuled ovary — Perigonium corolla-like, tubular-funnel-shaped. Stamens inserted on the calyx-tube or at its throat. Hypogynous scales manifest or 0. Ovule pendulous, anatropous; style 1, stigma capitate. Fruit dry, or an indehiscent berry. Embryo straight, radicle turned toward hilum. Albumen 0.

1. DAPHNE. ♄ Leaves leathery, elliptical to spathulate. Flowers .01 long or more.

2. THYMELÆA. ♄ Leaves fleshy, minute, ovate to oblong. Flowers small.

3. LYGIA. ♄ ⊙ Leaves linear to filiform. Flowers small.

1. DAPHNE, L. DAPHNE.

Flowers perfect. Perigonium funnel-shaped, 4-cleft, deciduous, throat destitute of scales. Anthers 8, nearly sessile, oblong, inserted in two rows at the throat, nearly included. Style terminal, short, stigma capitate. Berry fleshy or rather dry. Seed nut-like. Albumen 0. Embryo fleshy — Shrubs with leathery, entire leaves.

Fig. 327.



Involucral leaves and head of Daphne olæoides.

1. D. olæoides, Schreb. ♄ *'Ud-el-Khall.* .2 to .4, much-branched, naked below, leafy above. Leaves *pale green*, obovate to oblong-elliptical, .02 to .03 long, usually mucronulate, appressed-hairy to glabrescent at upper surface, appressed-pubescent at lower. Flowers terminal, clustered, sessile, *bractless;* perigonium .01 long, appressed-silky without, lobes *yellowish* within, triangular-ovate to lanceolate, *from half as long as to longer than tube;* berry dry — April to September — Subalpine and alpine Lebanon, Antilebanon, Hermon, Amanus, and northward.

2. D. sericea, Vahl. ♄ (Turcicé *Tawuk-Chicheka. Tefnel.*) .3 to 1 or more, much-branched, naked below, leafy above. Leaves *olive-green above*, elliptical, .03 to .05 long, tapering at base, or subspathulate, glossy, glabrous at upper surface, appressed-silky at lower, margin revolute. Flowers sessile, in terminal heads, and clustered in upper axils; *bracts scale-like, villous, much shorter than perigonium;* perigonium densely silky without, .015 long, lobes ovate, obtuse, *pink*, about a third *as long as tube;* berry red — March and April — Wooded zones of Cassius and Amanus from coast to 1000 m.; Lattakia.

3. D. linearifolia, Hart. ♄ 1 to 2, branching; twigs slender, reddish, glabrous, leafy. Leaves *linear, acuminate*, .03 to .05 long, .002 broad, glabrous, sessile. Flowers 10-15 in terminal, capitate clusters, subsessile, .004 long; short pedicels scabridulous-hispid; perigonium densely villous, *pale yellow*, lobes lanceolate, mucronate, one-half to one-third as long as tube; berry reddish-brown — Autumn — Petra, and at base of Jebel Harûn, 800 to 1000 m.

2. THYMELÆA, Tourn. Thymelæa. *Metnân.*

Flowers perfect or polygamous-diœcious. Perigonium funnel-shaped, deciduous or persistent, tube continuous, limb 4-cleft, throat destitute of scale. Stamens 8, inserted in two rows at apex of tube, filaments very short. Style lateral, stigmas capitate. Nutlet included in perigonium, or naked. Albumen 0 — Shrubs with small, yellow flowers, and (ours) minute, fleshy, imbricated leaves.

T. hirsuta, L. ♄ *Metnân.* 1 or more, fastigiate-branched; twigs nodding. Leaves ovate to oblong, .002 long, convex at upper surface, concave at lower, glabrescent. Flowers 5-10 in a cluster at or near tip of twigs, bractless, polygamous-diœcious; perigonium silky without, glabrous within, lobes somewhat shorter than tube; fruit ovate, glabrous — Spring — Sands; coast; Carmel; southern deserts; Dead Sea.

3. LYGIA, Fasan. Lygia.

Flowers perfect or monœcious. Perigonium urn-shaped or funnel-shaped, persistent, with a continuous tube, a 4-cleft limb, and throat

destitute of scales. Stamens 8, inserted in two rows at the apex of the tube, anthers subsessile, included. Style short, terminal, stigma capitate. Nutlet enclosed in the persistent perigonium — Annual herbs or shrubs, with inconspicuous flowers.

* *Annuals.*

1. L. Passerina, L. ⊙ .3 to .5, glabrescent; stem erect, simple or stiff-branched, leafy. Leaves linear-lanceolate, .014 to .005 long, sessile, tapering at both ends. Flowers perfect, green, axillary, sessile, single or 2-5 in a cluster, forming a long, leafy, *interrupted* spike; perigonium .002 long, appressed-pubescent, lobes ovate, obtuse, erect, half as long as tube; fruit shorter than bract, ovate, .003 long — Summer — Fields; Aleppo, and northward, and eastward.

2. L. pubescens, Guss. ⊙ .15 to .3, *pubescent;* stem stiff, with long, slender, upright branches. Leaves dense, *lenticular* to linear, .003 to .006 long, sessile, acute at both ends. Flowers axillary, 1-3 in a cluster, perfect, sessile, *white*, .0015 long, forming a long, *dense*, leafy spike; perigonium with ovate, obtuse, erect lobes half as long as tube; fruit ovate, .002 long, tapering at apex, a little shorter than perigonium, *as long as bract* — Spring — Shittim plain to Damascus, Palmyra, Aintâb, and eastward.

* * *Perennials, with shrubby base.*

3. L. Aucheri, Meissn. ♄ 1 or more, glabrous; stems numerous, wand-like, from a woody base, erect, simple or sparingly branched, leafy. Leaves *linear-filiform*, .015 to .005 long, acute, with revolute margins. Flowers 1-3 in axillary clusters, *monœcious*, nearly sessile, *greenish*, .005 long; perigonium appressed-pubescent, *lobes in staminate flowers, one-third to one-half as long as slender tube, in pistillate as long as tube;* fruit conical, scarcely shorter than perigonium, *much longer than minute bracts* — June to September — Lower, middle and subalpine zones of Lebanon to Amanus; Aintâb, and northward,

ORDER XC. **ELÆAGNACEÆ,** Lindley. (OLEASTER FAMILY.)

Shrubs or trees, with silvery-scurfy leaves, and perfect or (by abortion) diœcious flowers, an inferior perigonium, 2-4-cleft, imbricated in the bud, a disk lining the tube, as many stamens as the lobes, inserted at the throat, a free ovary enclosed in the tube, with 1, erect ovule, developing into a 1-celled, 1-seeded-fruit, closely invested by the pulpy tube, appearing like a drupe — Pericarp crustaceous. Seed erect, anatropous, with erect embryo, surrounded by narrow albumen, and an inferior radicle.

ELEAGNUS, L. SILVER-BERRY. *Zaizafûn.*

Flowers perfect, or the staminate with an abortive ovary. *Staminate flowers.* Perigonium campanulate, 4-6-cleft. Stamens as many as teeth, alternate with them, included, filaments adherent for most of their length with the perigonium, anthers 2-celled, fixed by their back. *Perfect flowers.* Tube cylindrical, limb 4-6-cleft, deciduous. Stamens as above. Glandular disk surrounding the style to the throat of the tube. Ovary oblong, 1-ovuled. Style elongated, stigma club-shaped.

Fruit a false drupe, the pulp and stone formed by the growth and hardening of the perigonium-tube, pericarp membranous, 1-seeded, apiculate at base of style. Albumen small, embryo straight, radicle inferior — Trees and shrubs, with alternate leaves.

E. hortensis, M. B. ♄ 5 to 8, unarmed or spinescent. Leaves lenticular-lanceolate to lanceolate-linear, sometimes ovate, .02 to .06 long. Flowers .005 long, 1-3 in the axillary clusters; pedicels about as long as silvery tube; lobes triangular, yellow within, rather shorter than tube; style glabrous; fruit either small, tasteless, or as large as an olive, edible — May and June — Spontaneous and cultivated; common.

ORDER XCI. LORANTHACEÆ, Lindl. (MISTLETOE FAMILY.)

Parasitic shrubs, with leaves opposite or 0 — Flowers perfect or diœcious. Calyx-tube adnate to ovary, with 3-4-cleft limb or 0. Corolla 0, or consisting of petals inserted on the calyx-tube. Stamens as many as calyx-lobes, opposite them or the petals. Ovary inferior, 1-celled, with 1, erect, orthotropous, ovule; style simple. Fruit a drupe-like berry, with seed adhering to the pericarp. Embryo 1-∞, inverted, half imbedded in a superficial depression of the fleshy albumen.

1. LORANTHUS. ♄ Petals 4-8. Flowers usually perfect.
2. VISCUM. ♄ Petals 4, scale-like in pistillate, 0 in staminate flowers.
3. ARCEUTHOBIUM. ♃ Petals 0. Flowers diœcious. Leafless plants with aspect of Salicornia.

1. LORANTHUS, L. MISTLETOE.

Flowers perfect, rarely diœcious. Calyx-tube ovate or top-shaped, connate with ovary, with very short, truncate or dentate limb. Petals 4-8, at top of calyx-tube, free, or connected at base, valvate. Stamens opposite petals, with filaments more or less adnate to them; anthers 2-celled. Style filiform; stigma simple. Berry ovate or top-shaped, 1-celled, 1-seeded.

1. L. Europæus, L. ♄ .3 to .5, glabrous, forked; branches terete. Leaves opposite, petioled, oblong-spathulate to elliptical, .02 to .03 long, obtuse, sparingly veiny, tapering at base. Flowers small, usually diœcious, opposite, *cream-colored*, arranged in simple, short, loose, terminal spikes; *petals* 6, linear, recurved, once-and-a-half as long as calyx; berry globular-obovate, .005 in diameter, yellow — June — On oaks; Amanus, and northward.

2. L. Acaciæ, Zucc. ♄ .3 to .6, glabrous; branches terete. Leaves nearly opposite, petioled, coriaceous, obovate to obovate-oblong, obtuse, .02 to .05 long, entire, tapering at base. Flowers short-pedicelled, 2-7 together in axillary clusters, or the upper solitary; calyx *truncate*, .002 long; corolla *crimson, linear-spathulate*, .025 long, 4-5-*cleft* for three-fourths of its length or more into linear-spathulate, at length revolute lobes, with gibbi at the sinuses; stamens about as long as corolla and style — April to August — On Jujube, Buckthorn, and Acacia trees; around Dead Sea, and in Jordan Valley; Moab; Hebron; el-'Arabah.

2. VISCUM, Mistletoe.

Flowers diœcious, *Staminate flowers:* calyx-limb 4-cleft. Corolla 0. Anthers 4, sessile, adnate to middle of calyx-lobes, ∞-celled, ∞-pored. *Pistillate flowers:* calyx adherent to ovary, with obscurely 4-toothed, short-limb. Petals 4, fleshy, scale-like, valvate. Berry 1-seeded; stigma sessile, obtuse — Branches jointed at forks; flowers green; leaves opposite.

1. V. album, L. ♄ .3 to .5; branches terete. Leaves leathery, fleshy, oblong, obtuse, 5-6-*nerved*, .02 to .04 long. Flowers 5-6 in a *sessile* head, sessile; berry .007 in diameter, globular, *white* — May and June — On various trees; Hermon; Amanus, and northward.

2. V. cruciatum, Sieb. ♄ .3 to .5; branches terete. Leaves leathery, fleshy, oblong, *obscurely* 3-*nerved*, .02 to .04 long. Flowers 2-4 in a *peduncled* head, sessile; berry globular, *red* — April and May — On Olive trees; central and southern Palestine. On Cratægus; Gilead.

3. ARCEUTHOBIUM, M. B. Arceuthobium.

Flowers diœcious. Corolla 0. *Staminate flowers* sessile. Calyx surrounded by a bipartite involucellum, 3-4-parted, the lobes anther-bearing; anthers spreading, adnate, 1-celled, dehiscent by a slit. *Pistillate flowers* pedicelled; calyx adnate to ovary, ovate, compressed, gaping at tip. Stigma sessile. Berry dry, separating elastically from the pedicel, and shooting out its seed — Small, leafless, forked, much branched parasites on species of Juniper.

A. Oxycedri, D. C. ♃ .05 to .1, glabrous, tufted; branches jointed, terete compressed. Leaves reduced to triangular, connate scales forming a small, cup-like sheath at joints. Staminate flowers sessile on the last joint; pistillate 1-2 together in the upper axils and terminal, short-pedicelled; berries ovoid — September — Subalpine Lebanon; Amanus; Akher Dagh, and northward.

Order XCII. SANTALACEÆ, R. Br. (Sandal-Wood Family.)

Herbs, shrubs, or trees, with entire leaves, the 3-5-*cleft perigonium valvate in bud, its tube not distinct from pedicels and more or less connate with ovary, which contains* 1 *cell, and* 2-4 *ovules, suspended from the apex of a stalk-like, central placenta arising from the base of the cell, but the fruit always* 1-*seeded* — Flowers perfect or polygamous-diœcious. Stamens 4-5, inserted at base of lobes, opposite to them. Style simple, stigmas 1-4. Fruit nut-like or drupe-like; embryo small, at tip of copious albumen; radicle superior.

1. THESIUM. ⊙ ♃ ♄ Flowers perfect. Fruit a small nutlet.

2. OSYRIS. ♄ Flowers diœcious or polygamous. Fruit a dry drupe.

1. THESIUM, L. Thesium.

Flowers perfect. Perigonium salver-shaped or funnel-shaped, 4-5-cleft. Disk indistinct. Filament inserted at base of each lobe of perigoni-

um bearded, linear. Anthers oblong, the cells splitting lengthwise. Ovary inferior; style filiform, stigma capitate; placenta filiform, erect, with 3 ovules at tip. Nut ellipsoid, caducous, generally crowned with calyx-lobes. Seed 1, inverse. Embryo straight. Radicle superior—Herbs, sometimes shrubby at base, flowers solitary or in axillary or extra axillary cymes.

* *Nutlet with oblique nervules between nerves or* 0. *Perennials.*

1. T. divaricatum, Jan. ♃ .3 to .5; stems erect or ascending, *ending in a pyramidal panicle;* branches of panicle 1-3-flowered, spreading or forked. Leaves linear, acute, 1-nerved. Bract and bracteoles scabrous-margined, *shorter than fruit;* nutlet ellipsoid, .003 long, twice to thrice as long as pedicel; lobes of perigonium furnished on either side with a dentate auricle, and one-third as long as ripe fruit—Summer—Subalpine Lebanon.

2. T. Libanoticum, Ehr. ♃ .05 to .1, scabrous; stems tufted, simple, *ending in short, few-flowered spikes.* Leaves linear-subulate, .005 to .01 long, those of rosettes needle-like. Bract longer than fruit, bracteoles shorter; nutlet ellipsoid, umbonate with the short, involute lobes of the perigonium—May and June—Alpine Lebanon.

* * *Nutlets with oblique and transverse nervules between nerves.*

† *Annuals or biennials.*

3. T. heterophyllum, Boiss. ② .2 to .3; stems numerous, rather thick, decumbent, sulcate-striate, simple or sparingly forked; twigs 3-5-flowered, loosely racemed. *Root-leaves rosetted, sessile, oblong-lanceolate,* almost destitute of nerves; stem leaves linear, *somewhat falcate,* acute, denticulate-scabrous. Bract and bracteoles lanceolate, scabrous, the bract much longer than fruit; nutlet ellipsoid, four times as long as its stalk, crowned with the *straight, convolute-margined, connivent lobes of the perigonium, which are half its length*—Summer—Amanus.

Var. **Billardieri,** Boiss. Root-leaves ovate, scale-like—Antilebanon.

FIG. 328.



Flowering twig of Thesium heterophyllum.

4. T. humile, Vahl. ⊙ ② *Habb-el-Hureish.* .1 to .3; stems numerous, erect, ascending, or spreading, striate-angled, densely leafy, ending in long, slender spikes or racemes. Leaves linear, 1-nerved, serrulate-scabrous. Bract very long, bracteoles longer than fruit; flowers .002 to .003 long; lobes of perigonium short-ovate; nutlet .002 long, ellipsoid, scarcely stipitate, *umbonate with the short, connivent lobes*—May to July—Hillsides and fields; coast to middle mountain zone.

* *Perennials*

5. T. Bergeri, Zucc. ♃ .1 to .3, glabrous; stems numerous, decumbent to erect, angled; branches stiff, ending in long, slender, leafy racemes. Leaves linear, elongated, acute, 1-nerved. Branches of raceme 3-1-flowered, short, spreading; bract similar to leaves, much longer than flowers and fruit, bracteoles much shorter, but longer than

flower; flowers minute; fruit scarcely .002 long, umbonate with short, ovate, connivent lobes of perigonium — Summer — Coast and lower and middle zones of Lebanon, Antilebanon, and Amanus, to alpine regions.

6. T. macranthum, Fenzl. ♃ .15 to .4, glabrous; stems from a woody root-stock, erect or ascending, paniculate. Leaves linear, acute, *obscurely many-nerved.* Racemes loose; twigs 1-3-flowered; bracts and bracteoles linear-lanceolate, about as long as flower; perigonium .008 long, cleft for *three-fourths of the length of its free portion into linear-lobes with inflexed margin, and incurved tip ; stamens nearly as long as lobes;* nutlet .005 long, ellipsoid, strongly netted, *crowned by the persistent, ascending, divergent calyx-lobes and stamens* — June — El-Jebel-el-Aḥmar (Amanus).

7. T. brachystegium, Post. ♃ .1 to .15, glabrous, many-stemmed from neck; stems decumbent or ascending, flowerless below. Leaves fleshy, linear-triquetrous, .01 long, .001 broad, mucronulate. Flowers *minute,* with short, 4-angled pedicels; *racemes* .01 to .02 *long in the upper axils, or compacted in a terminal cyme,* leafless or leafy, *dense ;* bracts and bracteoles lanceolate, keeled, *shorter than flowers, and little longer than* fruiting pedicels; nutlet .002 long, ellipsoid, with a very short umbo composed of the lobes — August and September — Gaiour Dagh (Amanus).

2. OSYRIS, L. Osyris.

Flowers diœcious or polygamous. Perigonium 3-4-parted, lobes ovate, acute, caducous, tube in staminate flowers slender, in pistillate obconical. Disk concave, lining the upper and entire part of perigonium, lobes rounded. Stamens 3-4, inserted at margin of disk, filaments short, anthers 2-celled. Ovary fleshy, inferior; style short; stigmas 3-4, alternate with lobes of perigonium. Placenta very short, in the minute cavity of the ovary, bearing at its tip 3-4 ovules. Drupe dry, ovoid-globular, crowned by remnants of lobes and disk. Seed filling the drupe, albumen abundant, embryo short, superior, radicle superior — Shrubs or trees, with angled branches, the staminate flowers crowded, pedicelled, the pistillate solitary or few.

O. alba, L. ♄ .5 to .8, evergreen. Leaves elliptical and oblong to oblong-linear, .01 to .015 long, acute or obtuse, mucronate. Staminate cymes many-flowered, the flowers pedicelled; pistillate cymes 1-few-flowered, the flowers subsessile; bracts caducous; perigonium 3-lobed; drupe red, .008 in diameter, leathery — May to September — Shrubby places; coast to lower and middle mountain zones.

ORDER XCIII. BALANOPHORACEÆ, Rich.

(CYNOMORIUM FAMILY).

Parasitic herbs, with polygamous or diœcious flowers, crowded on a club-shaped spadix, with an imperfect or few-lobed perigonium, (ours) a single stamen, a 1-*celled ovary containing* 1, *pendulous ovule, the fruit containing seed which fills the cavity, and a minute lateral embryo, and oleaginous albumen* — Ovary inferior or semi-inferior. Fruit indehiscent, nut-like or somewhat drupe-like.

CYNOMORIUM, Micheli. CYNOMORIUM.

Flowers polygamous, mixed on the same spike, bracteolate at base. *Staminate flowers.* Divisions of perigonium 1-5, linear-spathulate; stamen solitary, posterior, with a cylindrical filament, a bilocular anther, the cells bilocellate; rudiment of ovary oblong-club-shaped, fitting into a gooove of the filament. *Pistillate flowers.* Divisions of perigonium 1-5, half superior or superior, linear-club-shaped, adnate to ovary. Ovary sessile or somewhat stalked, ending in a grooved style and obtuse stigma, 1-celled, the single ovule suspended by a short funicle from the tip of the cell, hemitropous. *Perfect flowers.* Few, more or less imperfect, but fertile. Fruit nut-like, pericarp thin, somewhat leathery, connate to testa. Seed nearly globular, embryo lateral, within the albumen.

C. coccineum, L. ♃ *Mosrûr. Zibb-el-Ard.* Scape .1 to .2, terete, .015 thick, clothed with few, deciduous scales, ending in a club-shaped spadix, .02 to .03 thick, and about .1 long. Cymes confluent, covering the surface of the spadix; primary bracts peltate, at first imbricated, then remote, at length deciduous; staminate flowers usually sessile in a common receptacle; pistillate and perfect flowers usually in cymes — April to July — Sands of coast and salt marshes of interior. Conspicuous by its thick, crimson spadix.

ORDER XCIV. **EUPHORBIACEÆ**, Juss. (SPURGE FAMILY).

Plants with acrid, milky, or colorless juice, and usually monœcious or diœcious flowers. Fruit of 2-3 *or several,* 1-2-*seeded pods, united around a central axis, separating elastically when ripe (in Buxus loculicidally dehiscent)* — Calyx free, or 0. Petals alternate with calyx-lobes, or 0. *Staminate flowers.* Stamens inserted in the centre of the flower; filaments free, or more or less connate. *Pistillate flowers.* Ovary free; stigmas 2-3, often forked. Seeds with more or less leathery testa; albumen fleshy; embryo straight; radicle turned toward hilum.

* *Flowers monœcious, both kinds with a minute calyx or* 0, *enclosed in a common, cup-shaped involucre.*

1. EUPHORBIA. ⊙ ♃ ♄ Involucre enclosing numerous, staminate flowers, each consisting of a single stamen, and 1, pistillate flower, consisting of a 3-lobed pistil.

* * *Flowers monœcious, or diœcious, the two kinds not enclosed in a common involucre.*

† *Flowers monœcious.*

2. BUXUS. ♄ Stamens 4. Erect shrubs, with leathery, evergreen leaves, .02 to .03 long. Apetalous.

3. ANDRACHNE. ♃ ♄ Stamens 5. Prostrate herbs with a woody base, leaves .003 to .006 long. Ours with petals.

4. CROZOPHORA ⊙ ♄ Stamens 5-15. Scurfy with stellate hairs or scales, the staminate flowers spiked above the pistillate. Flowers with petals.

5. RICINUS. ♃ Staminate flowers in much-branched clusters, below the pistillate. Shrubs or small trees, with peltate-palmate, 7-11-lobed leaves.

† † *Flowers diœcious.*

6. MERCURIALIS. ⊙ Staminate flowers in clusters along axillary peduncles; pistillate 1-2 together, subsessile, axillary. Glabrous herbs.

1. EUPHORBIA, L. EUPHORBIA. SPURGE. *Huleib-el-Bûm.*

Flowers monœcious, included in a cup-shaped, 4-8-lobed involucre, resembling a calyx or corolla, usually bearing glands at the sinuses. *Staminate flowers* numerous, lining the base of the involucre, each from the axil of a little, ciliate-fringed bract, which takes the place of a calyx, and consisting of a single stamen, with a jointed filament. *Pistillate flower* solitary in the middle of the involucre, often protruded on a long pedicel, with a 3-6 lobed, often obsolete, calyx. Ovary 3-celled, the carpels splitting into 2 valves. Styles 3, each bifid — Shrubs or herbs, with acrid, milky juice, the uppermost leaves often in whorls or pairs. Peduncels lateral or terminal, often umbellate-clustered.

FIG. 329.



(*a*) Branch of a typical Euphorbia (corollata). (*b*) An involucre containing several staminate flowers, and one pistillate. (*c*) A staminate flower with its ciliate bract, and jointed filament. (*d*) Transverse section of a fruit, showing its 3 carpels. (*e*) Longitudinal section of a carpel showing its structure and relation to the axis. (*f*) The embryo with superior radicle.

* *All the leaves opposite, stipuled, oblique at base. Glands appendaged. Prostrate annuals.*

1 E. Peplis, 2 granulata, 3 Chamæsyce, 4 Ægyptiaca.

* * *Lower leaves scattered, the rest opposite, all stipuled. Glands not appendaged, palmatifid. Annuals, with solitary involucres.*

5 E. Postii.

* * * *Leaves opposite, or scattered, not stipuled, the floral opposite or whorled. Glands not appendaged, entire, or truncate-2-horned.*

† *All the leaves except the lowest opposite. Glands pectinately 2-8-cleft. Styles undivided. Inflorescence forked. Annuals.*

6 E. lanata.

† † *Leaves not opposite, scattered or crowded. Bracteoles between staminate flowers hirsute or plumose.*

‡ *Glands truncate-2-horned. Infloresence umbelled. Caruncle of seed conical, elongated, longitudinally grooved. Annuals.*

7 E. cornuta.

‡ ‡ *Glands transversely ovate, with rounded margin, not 2-horned. Inflorescence umbelled. Annuals and perennials.*

§ *Seeds smooth.*

¶ *Capsule smooth or minutely tubercled.* (8) *annual, others perennial.*

8 E. altissima, 9 arguta, 10 eriophora, 11 Gaillardoti.

¶ ¶ *Capsule warty.* (12) *annual,* (13-15) *perennials.*

12 E. Cybirensis, 13 Apios, 14 thamnoides, 15 erinacea.

§ § *Seeds minutely tubercled. Capsule warty and villous. Perennials.*

16 E. pubescens.

§ § § *Seeds netted-wrinkled. Annuals.*

17 E. helioscopia, 18 Berythea, 19 oxyodonta.

§ § § § *Seeds pitted, or excavated-grooved.* (20) *perennial,* (21) *annual.*

20 E. Cassia, 21 phymatosperma.

‡ ‡ ‡ *Glands truncate, retuse, or more or less 2-horned. Inflorescence umbelled, rarely dichotomous.*

§ *Seeds tubercled. Annuals.*

22 E. Aleppica, 23 parvula, 24 exigua.

§ § *Seeds transversely grooved. Annuals.*

25 E. falcata.

§ § § *Seeds longitudinally grooved, or with longitudinal rows of pits. Annuals.*

26 E. aulacosperma, 27 Peplus, 28 peploides, 29 Chamæpeplus.

§ § § § *Seeds irregulary pitted, mottled, or netted-wrinkled.*

¶ *Annuals.*

30 E. Szowitsii, 31 Reuteriana, 32 pusillima.

¶ ¶ *Perennials.*

33 E. obovata, 34 Chesneyi, 35 caudiculosa.

§ § § § § *Seeds smooth. Perennials.*

¶ *Floral leaves free.*

36 E. Terracina, 37 tinctoria, 38 Paralias.

¶ ¶ *Floral leaves connate.*

39 E. macrostegia.

† † † *Leaves spirally arranged, imbricated. Glands pectinate or 2-horned. Bracteoles between flowers obsolete. Inflorescence umbelled.*

40 E. denticulata, 41 biglandulosa.

1. E. Peplis, L. ⊙ .2 to .5, glabrous, *fleshy, glaucescent,* branching from neck; branches alternate-branched. Leaves nearly sessile, unequal at base, with one, obtuse auricle, *oblong-rhombic,* .01 to .015 long, *base sometimes repand-dentate,* otherwise entire; stipules 2-3-*cleft into subulate lobes.* Involucres solitary in axils and at forks, pedicelled, campanulate, hirsute at throat, lobes triangular, ciliate; glands transversely oblong, concave, with a narrower, entire or lobuled appendix; capsule .003 broad, with rounded carpels — June to October — Sands; coast; Moab.

2. E. granulata, Forsk. ⊙ *Libbein.* .2 to .4, *velvety,* grey, branching from neck; branches brittle. Leaves entire, unequal at base, obovate to elliptical, .002 to .005 long; stipules minute, *lanceolate,* ciliate. Involucres minute, axillary, subsessile, forming short, leafy racemes, turbinate, velvety, hirtulous at throat, lobes ovate, fringed; appendage as broad as glands or narrower; capsule appressed hirsute, with rounded carpels — Spring — Wadi 'Aqabah.

3. E. Chamæsyce, L. ⊙ .2 to .4, more or less hirsute to canescent, branching from neck; branches filiform. Leaves *ovate to suborbicular,* .002 to .008 long, unequal at base, obtusely crenulate; stipules *setaceous, often with a small tooth at base.* Involucres solitary in the forks and upper axils, turbinate, .0015 long, glabrous or hirsute, ciliate at throat, lobes ovate-triangular, fringed; glands transverse, *wax-colored,* somewhat concave, appendix as broad or narrower, more or less trilobed; capsule glabrous or hirsute, .0015 long, carpels keeled — Summer — Fields and waste places; common.

4. E. Ægyptiaca, Boiss. ⊙ *Libbein. Rijlet-Iblîs.* .4 to .6, crisp-hirtulous, branching from neck; branches stoutish. Leaves *oblong-elliptical,* .01 to .02 long, oblique and sometimes somewhat cordate at base, remotely serrulate-crenate, the teeth muticous or mucronate; stipules *lanceolate,* fringed. Involucres solitary in axils, .0015 long, forming short, leafy racemes, turbinate, hirsute, glabrous within, lobes ovate, fringed; glands *red,* transversely ovate, concave, with narrow or obsolete appendage; capsule appressed-hirsute, .002 long, carpels keeled — January — Ghor-es-Safieh.

5. E. Postii, Boiss. ⊙ .4; young twigs and branches hirsute, older parts *glaucous;* branches 2-3-chotomous. Leaves mostly opposite, short-petioled, ovate to ovate-oblong, .02 to .03 long, denticulate; stipules subulate, minute, two on each side. Pedicels short, involucres hemispherical, glabrous, lobes fringed; glands long-stipitate, transversely oblong, 5-7-*palmatifid beyond the middle;* ovary glabrous — June and July. Between Hamath and Maharadee. Plant with aspect of E. lanata, Sieb., but glabrescent.

6. E. lanata, Sieb. ⊙ .2 to .4, *appressed-villous, canescent,* forked from base, erect. Leaves petioled, ovate to oblong-ovate, .01 to .03 long, spinulose-denticulate. Involucres at forks and terminal, short-peduncled, hemispherical - campanulate, bearded without and within, lobes triangular - ovate, fringed; glands transversely-oblong, hirsute at lower surface, pectinate-cleft into 2-8, setaceous lobes; capsule ovate, *fleecy*, .005 long, carpels keeled — June to September — Fields, vineyards and orchards; interior plains; Galilee.

7. E. cornuta, Pers. ⊙ *Melbein. Libbein. Nu'mâniyeh. As'ad. Libbâneh.* .25 to .4, sometimes perennant, *glabrous, glaucescent.* Leaves somewhat fleshy, sessile, linear to ovate-oblong, .02 to .03 long, acute or retuse, more or less acutely serrate. Rays of umbel 2-3, several times forked; floral leaves *dilated and cordate at base, caudate-acuminate, pectinate-serrate, usually recurved at tip;* involucre campanulate, with triangular, fringed lobes; glands somewhat concave, transversely ovate, with 2-4, short horns at edge, or palmately 6-10-cleft; capsule .006 long, carpels rounded — Spring — Et-Tîh and Sinai to Egyptian Desert.

8. E. altissima, Boiss. ♃ 1 to 3, *hirsute to white-fleecy*, rarely glabrescent; stems from a thick root-stock, leafy, ending in a panicle .3 to .6 long, with a 6-7-rayed umbel at top. Leaves sessile, *linear-lanceolate to oblong-lanceolate*, .1 long, .008 to .015 broad, with a white nerve at lower surface, minutely serrulate, especially toward tip, the floral ovate, .01 to .02 long, mucronate. Involucre campanulate, hairy, lobes ovate-oblong; glands ovate; capsule globular, .004 to .005 long, hairy and minutely tubercled, carpels rounded — Summer — By water; Cœlesyria, Antilebanon, Aintâb, Marash, and northward.

9. E. arguta, Soland. .3 to .4, soft - hispidulous, glaucescent; stem simple or branching from base, branches ending in a simple umbel, or a panicle. Leaves *acutely and deeply serrate*, oblong to oblong-lanceolate, .02 to .04 long, the lowest somewhat spathulate, obtuse, the others obtuse or acute. Rays of umbel 3-5, 1 to 5 times forked; floral leaves .005 to .008 long, *rhombic-ovate;* involucre turbinate, glabrous without, hairy under glands within, lobes short-ovate, fringed-dentate; capsule .003 long, minutely tubercled, carpels rounded — April to July — Fields; coast, and lower mountains, and interior plains.

10. E. eriophora, Boiss. ⊙ .15 to .35, *soft-hispid, grey;* stem erect, branching chiefly above, umbelled or short-panicled at top. Leaves sessile, narrowed at base, oblong to oblong-lanceolate, .02 to .04 long, acute, entire or minutely denticulate, the floral *ovate-oblong to ovate*, .03 to .01 long, acuminate or mucronate, serrulate. Rays of umbel 3, twice or thrice forked; involucre turbinate, glabrous without, hairy within, lobes ovate, truncate, fringed-torn; glands stipitate, reniform, the upper margin curved; capsule depressed globular, .006 broad, *hairy*, carpels rounded — May and June — Waste fields; Aintâb, and northward, and eastward.

11. E. Gaillardoti, Boiss. et Bl. ⊙ *Umm-Milhabarah.* .3 to .6, glabrous, green-glaucescent, branching from base or above, ending in an umbel or cymose panicle. Leaves nearly sessile, tapering at base, *oblanceolate*, more or less serrulate or nearly entire, at length deflexed and

soon deciduous. Branches of umbel 5, elongated and many times forked; *floral leaves nearly orbicular*, .005 to .015 long, mucronate, *approximated, somewhat imbricated;* involucre top-shaped, hairy at throat within, lobes ovate, fringed; glands transversely ovate-triangular; capsule ovate, .0015 long, glabrous, carpels rounded-keeled — Summer — Fields; Banias, Cœlesyria, and Antilebanon, to Hums, Hamath, Palmyra, and northward, and eastward.

12. E. Cybirensis, Boiss. ⊙ .3 to .5, glabrous; stem erect, simple, or somewhat branched. Leaves sessile, the lowest *obovate-spathulate*, obtuse, .01 to .04 long, the others *elliptical, acutish*, and all *serrulate toward tip.* Rays of umbel 5, elongated and several times forked; floral leaves cordate-deltoid, .005 to .015 long, mucronate; lobes of bell-shaped involucre ovate, dentate; glands transversely oblong. Capsule as long as its stalk, .003 in diameter, *spherical, hardly grooved, more or less beset with conical spines ending in a bristle* — Spring — Fields and roadsides, common.

Var. **acuta,** Boiss. Leaves oblong-elliptical, acute or acuminate.

13. E. Apios, L. ♃ .1 to .2, hirtulous to glabrescent; *root an ovate or spindle-shaped tuber, bearing a slender, subterranean, scaly trunk,* branching at surface of ground; branches *decumbent or ascending*, leafy. Leaves sessile, rounded or tapering at base, *oblong-elliptical*, .01 long, serrulate, obtuse. Umbel 3-5-rayed, *rays simple or bifid;* floral leaves transversely ovate to rhombic, retuse, .004 to .005 long; involucre campanulate, glabrous, lobes ovate, somewhat dentate; capsule ovate, .004 long, 3-grooved, warts short-cylindrical, purplish — March and April — Hills and bushy places.

Var. **lamprocarpa**, Boiss. Leaves nearly entire; warts hemispherical, somewhat scattered; seed brownish, glossy — Banias and Antilebanon to Damascus, Palmyrene Desert, Cassius, Amanus, and northward.

14. E. thamnoides, Boiss. ♄ .3 to 1 or more, glabrous; root of young plant turnip-shaped; branches wand-like, densely leafy, simple. Leaves short-petioled, oblong, .02 to .05 long, obtuse or acutish, entire, tapering at base; umbellar and floral leaves *at first yellow, then reddish*, the latter obovate, obtuse. Rays of umbel 5, twice or thrice forked, short; lobes of campanulate involucre broad-ovate, denticulate; capsule spherical, .004 in diameter, 3-sulcate, covered with conical and cylindrical warts — March and April — Rocks; coast and coast-ranges; a showy bush.

Var. **Hierosolymitana,** Boiss. Leaves obovate, obtuser; capsule somewhat larger — Jerusalem; Antilebanon.

Var. **dumulosa,** Post. .15 to .25, with stiff branches. Leaves .005 to .015 long — Gilead; Moab; Judea; Lebanon.

15. E. erinacea, Boiss. et Ky. ♄ .2 to .3, glabrous; branches intricate, stiff, 1-*headed, at length spinescent.* Leaves lenticular to oblong-lanceolate, .005 to .008 long, acute, minutely serrulate, *the floral similar but smaller.* Involucre hemispherical-turbinate, hirsute within, lobes ovate, ciliate; capsule borne on a stalk almost as long as itself, ovate-spherical, .003 long, 3-sulcate, with *few, flattened-hemispherical warts* — Summer — Alpine Hermon and southern Antilebanon.

16. E. pubescens, Vahl. ♃ .3 to .8, *villous;* stems erect or ascending, at length woody below, leafy. Leaves sessile, oblong to oblong-lanceolate, .02 to .06 long, rounded or subcordate at base, serrulate. Rays of umbel 5, primary trichotomous, secondary dichotomous; floral leaves subcordate at base, *ovate-rhombic*, .005 to .015 long, involucre campanulate, hirsute without, lobes ovate, truncate, ciliate; capsule spherical, .004 in diameter, *villous between short-cylindrical warts* — January to August — Moist places and fields; coast, lower mountains, and interior plains.

17. E. helioscopia, L. ⊙ .1 to .5 glabrescent; stems branching from base, thick, erect or ascending, *at length naked below.* Leaves glabrous, *obovate-cuneate or spathulate, obtuse,* .01 to .03 long, serrulate, tapering into a short petiole. Umbels 5-rayed; rays pubescent, primary trichotomous, secondary dichotomous; floral leaves elliptical or round, .01 to .02 long; lobes of involucre fringed, capsule *glabrous*, globular, .004 in diameter, trisulcate; seed ovoid — Spring — Fields and roadsides, throughout.

Var. **Haussknechtii,** Boiss. Umbellar, and upper leaves more acute — Aleppo to Aintâb, and eastward.

18. E. Berythea, Boiss. ⊙ .2 to .4, sparingly hairy; stem simple or branching from base. Leaves obovate to *lenticular-oblong*, .01 to .03 long, acute, *acutely denticulate.* Rays of umbel 3-5, trichotomous then dichotomous; floral leaves triangular-ovate, .01 to .004 long; involucre turbinate, hirsute within, lobes broad, truncate, ciliate; capsule trilobed, flattened-globular, .003 in diameter, carpels rounded, *hairy and minutely roughened* — April and May — Coast of Syria.

19. E. oxyodonta, Boiss. et Haussk. ⊙ .1 to .15, hispidulous with long, sparse hairs, branching from base; stems erect or decumbent, simple. Leaves *deeply pectinate-dentate*, the lowest ovate-spathulate, tapering into a short petiole, the others sessile, elliptical, .015 to .02 long. Floral leaves ovate; involucre turbinate, glabrous, lobes broad, ciliate; *capsule glabrous*, globular, deeply 3-grooved — March — Rocks and fields; Ḥaurân to Aleppo, and eastward.

20. E. Cassia, Boiss. ♄ .3 to .4, glabrous, woody at base; stems numerous, erect, simple or forked above, leafy. Leaves sessile, stiff, minutely serrulate toward tip, the lowest oblong-spathulate, obtuse, the upper oblong-linear to linear, .01 to .02 long, .002 to .003 broad, acute. Umbels small, with 2-3, short, unequal rays, and sometimes a single involucre; *umbellar leaves about as long as rays;* floral leaves *tapering at base, ovate-rhombic, acuminate;* involucre turbinate-campanulate, lobes broad-ovate, ciliate; capsule trilobed, flattened-globular, .0035 in diameter, glabrous, carpels keeled, *seed ovoid, irregularly pitted-grooved* — Summer — Lower and middle Lebanon to Cassius, and Amanus.

Var. **latifolia,** Post. Leaves oblong to elliptical; rays sometimes twice as long as umbellar leaves, sometimes 0; seeds somewhat more pitted than in type — El-Jebel-el-Aḥmar (Amanus).

21. E. phymatosperma, Boiss. et Gaill. ⊙ .05 to .1, glabrous, glaucous; stem erect, simple. Leaves sessile, obovate, obtuse, entire. Umbels about 3-rayed, rays short, bifid; *umbellar leaves somewhat longer than the others, elliptical,* .012 long; floral leaves ovate-rhombic, mucro-

nate; involucre small, campanulate, lobes broad-ovate, obtuse; capsule *ovate*, .003 long, carpels rounded, glabrous; seeds *oblong-tetragonal, with three transverse grooves at each face, and leprous-dotted* — April — Suq-Wadi-Barada, Jebel Qaisûn (Damascus), Aleppo, and north-eastward.

22. E. Aleppica, L. ⊙ .2 to .4, glabrous or pruinose-scabrous, glaucous; stem simple or branching from neck, *very densely leafy*, at length naked, and *thickly dotted with scars of leaves.* Stem-leaves entire, sessile, mucronate, .01 to .04 long, .001 to .005 broad, *the lowest setaceous, the upper linear, the umbellar linear-oblanceolate.* Rays of umbel 3-5, thick, many times forked, at length elongated; floral leaves ovate-rhombic, .01 to .02 long, aristate; involucre turbinate-campanulate, hirsute at throat, lobes small, oblong, fringed; glands semilunar, broader than long; capsule oblate-spheroid, .002 broad, deeply grooved, carpels keeled — June to October — Fields and vineyards; common to subalpine regions.

23. E. parvula, Del. ⊙ .05 to .1, glabrous; stem simple or branching below. Leaves entire, *obovate-spathulate*, .005 to .01 long, obtuse or retuse, mucronulate, the umbellar oblong-spathulate. Rays of umbel 2-3, several times bifid; floral leaves *oblong-lanceolate*, acute; involucre minute, turbinate, lobes oblong, ciliate; glands rather concave, transversely ovate, with 2, short or obsolete horns; capsule oblate-spheroid, .0015 broad, carpels rounded — Spring — Fields; southern borders of Palestine, and southward to Egypt.

24. E. exigua, L. ⊙ .05 to .25, glabrous, usually branching from base, densely leafy. Leaves *oblong-linear to linear*, .005 to .015 long, the umbellar and floral *somewhat dilated or subcordate at base, oblong-lanceolate to triangular-lanceolate*, .01 to .02 long. Rays of umbel 3-5, several times forked; involucre turbinate, hirtulous at throat, lobes ovate, dentate; glands semilunar, broader than long, horns divergent, longer than breadth of gland; capsule ovate, .0015 long, 3-grooved, carpels keeled — April and May — Fields along coast.

25. E. falcata, L. .1 to .4, glabrous, glaucescent; stems simple or branching from base, erect or ascending. Leaves entire, *with scabridulous margins*, tapering at base, the lower cauline oblong-spathulate, .005 to .02 long, obtuse or retuse, the upper and umbellar oblong to lanceolate, acute. Umbels 3-6-rayed, several times bifid; floral leaves *ovate to elliptical-ovate*, oblique, acuminate-mucronate; involucre turbinate, lobes ovate, fringed; glands broader than long, with long horns; capsule ovate, .002 long, carpels keeled — May to July — Fields; common.

Var. **Galilæa**, Boiss. Floral leaves small; capsule .001 to .0015 long, longer stalked; seeds smaller, the grooves reduced to pits — Common.

Var. **ecornuta,** Boiss. Glands with small horns or 0 — Aleppo.

26. E. aulacosperma, Boiss. ⊙ .1 to .2, glabrous; stems simple or branching from base. Leaves obsoletely denticulate, obovate-cuneate, .005 to .015 long, obtuse or retuse. Rays of umbel 3, several times forked; floral leaves *triangular-rhombic*, oblique, broader than long; horns of glands twice to thrice as long as breadth of gland; cap-

sule oblate-ovate, .002 long, 3-grooved, carpels rounded — February to May — Fields; common.

Var. **fossulata,** Boiss. Smaller; grooves of seed of same color as seed — Damascus.

27. E. Peplus, L. ⊙ *Ma'laqah. Wudeinah. Sâbûn-gheit.* .2 to .3, glabrous, branching, erect. Leaves tender, entire, petioled, *obovate.* .005 to .025 long, obtuse or retuse. Rays of umbel 3, several times forked; horns much longer than breadth of glands; capsules ovate, .0015 long, deeply 3-grooved, carpels compressed, *with two wing-like keels* — Spring and summer — Fields and road-sides, everywhere.

28. E. peploides, Gou. would appear to be a more round-leaved variety of the last, with almost no style, and a smaller seed, with fewer pits — Common.

29. E. Chamæpeplus, Boiss. et Gaill. ⊙ .05 to .15, glabrous, erect, branching from base. Leaves sessile or short-petioled, obovate to elliptical, .005 to .01 long, obtuse or retuse. Rays of umbel 3, short, bifid; floral leaves oblong; horns slender, somewhat longer than breadth of glands; capsule ovate, .0015 long, carpels rounded — Spring — Jerusalem; Damascus; Antilebanon plateau; Dead Sea.

Var. **Sinaica,** Boiss. Pits of obscurely hexagonal seed irregularly arranged — Sinai; Jericho.

30. E. Szovitsii, F. et M. ⊙ .05 to .15, glabrous, glaucescent; stem *dividing almost from base* in a 3-5-rayed, much-forked umbel. Leaves somewhat fleshy, entire, *cuneate-linear*, .01 to .02 long, .001 to .002 broad at tip, *those of forks often falcate.* Glands transversely oblong, truncate, usually short-two-horned; capsule ovate, .0015 long, carpels *keeled* — May and June — Fields and stony places; Cœlesyria to Aleppo, Aintâb, and northward.

31. E. Reuteriana, Boiss. ⊙ .2 to .4, glabrous, glaucescent; stem erect, nearly simple. Lowest leaves minute, *obcordate*, the others *linear*, .01 to .02 long, obtuse or retuse, mucronulate, the uppermost acute. Rays of umbel 3-5, several times forked; floral leaves short-cuneate at base, *broader than long, reniform, very obtuse*, mucronulate; horns longer than breadth of glands; capsule ovate, .003 to .004 long, carpels rounded — May and June — Fields ; coast, and lower mountains, and interior plains.

32. E. pusillima, Post. (Bull. Herb. Boissier III. 162.) ⊙ .02 to .06, glabrous; stem simple, leafy. Leaves entire, green at upper surface, *reddish-purple at lower*, the lowest short-petioled, the upper sessile, all *cuneate-obovate*, .005 to .008 long, truncate or slightly retuse. Rays of umbel 3-5, about as long as umbellar leaves, not forked, floral leaves *obliquely ovate*, very obtuse; glands semilunar, purple, horns as long as breadth of gland; capsule * * — April — Gravelly soil on lava at base of Kurd Dagh, near Tcheftalik.

33. E. obovata, Dec. ♃ .2, glabrous, glaucous; stems decumbent or ascending from a vertical, woody root-stock, branching above, the branches and 3-5 rays of umbel several times forked.

Leaves fleshy, *short-petioled, cuneate-obovate*, .006 to .01 long, obtuse, *muticous.* Rays of umbel 3-5, several times forked; floral leaves *orbicular;* horns about as long as breadth of glands, divergent; capsule *ovate-oblong, a little larger than a hemp-seed, slightly grooved* – May and June — Sands; Sinai.

34. E. Chesneyi, Cl. at G'cke. ♃ .2 to .3, glabrous, glaucescent, shrubby at base; stems erect or ascending, simple. Leaves sessile, entire, *oblong-elliptical to elliptical or elliptical-lanceolate*, obtuse or acute. Rays of umbel 4-5, short-bifid; floral leaves *round-ovate*, mucronulate; glands transversely ovate, horns short; capsule ovate-oblong, .004 long, grooved, carpels rounded — May and June — Alpine Antilebanon; Antilebanon plateau to Palmyrene Desert, and northward, and eastward. Seems to be the same as *E. petrophila, C.A.M.*

35. E. caudiculosa, Boiss. ♃ .02 to .03, glabrous, pale green; stems *brittle, with a long, white, subterranean portion descending to the thick, vertical root-stock*, the exserted part of the stem densely leafy. Leaves somewhat fleshy, entire, *obovate-cuneate to oblong-spathulate*, .004 to .008 long, the lowest petioled, the upper sessile. Umbel *capitate*, short-3-rayed, 3-1-headed; floral leaves *obovate-rhombic;* horns as long as breadth of transversely ovate glands; capsule oblong-ovate, .003 long, deeply grooved, carpels keeled — June and July — Gravel; highest Alpine summits of Lebanon and Hermon.

36. E. Terracina, L. ♃ .5 to 1, glabrous; branches from base, erect or ascending. Leaves oblong to linear-lanceolate, or oblong-linear, .01 to .04 long, mucronulate, serrulate above middle, sometimes truncate-retuse. Rays of umbel 3-5, several times forked; umbellar leaves ovate-elliptical: floral half-round or ovate-triangular; horns longer than breadth of gland; capsule broader than long, .004 broad, 3-lobed, carpels keeled — Spring and summer — Fields; common; coast to 1000 m.

Var. **prostrata,** Boiss. Stems prostrate; leaves small — Sinai.

37. E. tinctoria, Boiss. et Huet. ♃ .3 to .5, *yellowish*, pruinose, many-stemmed; root-stock bearing creeping suckers; stems thick, white, striate-grooved, leafy, more or less branched below umbel. Leaves leathery, entire, tapering at base, oblanceolate to *lanceolate*, .03 to .06 long, acute, mucronate, with prominent nerves at lower surface. Branches and rays 7-20, 1-2-bifid; umbellar leaves *ovate-oblong* to ovate, acute; floral *rhomboid-deltoid* to reniform, mucronate; horns *shorter* than breadth of glands; capsule ovate, glabrous or tomentellous, .007 long, *obsoletely-grooved* — April to August — Dry gravel; subalpine and alpine Lebanon, Antilebanon, and interior tablelands.

38. E. Paralias, L. ♃ .3 to .5, glabrous, glaucous, many-stemmed from a branching root; stems erect, stiff, densely beset with *imbricated* leaves. Leaves leathery, entire, *elliptical-obtuse to oblong-acute*, .01 to .02 long, .003 to .006 broad; umbellar leaves *cordate-ovate.* Rays of umbel 3-5, thick, short, twice to thrice bifid; floral leaves *cordate-reniform*, mucronulate; horns short, spreading; capsule broader than long, .006 broad, 3-lobed, carpels rounded — Summer — Sands; coast.

39. E. macrostegia, Boiss. ♄ .6 to .8, shrubby at base; stems *reddish*, at length naked below, branching; branches below umbel, and

5-rayed umbel several times bifid. Leaves leathery, glossy at upper surface, pale at lower, glabrous or minutely hairy, somewhat petioled, tapering at base, *ovate-oblong to oblong, or elliptical*, .02 to .04 long, the umbellar ovate. Floral *leaves connate in a broad, orbicular, retuse plate ;* horns of glands short, divergent; capsule ovate, .003 long, puberulent or glabrous — April to June — Subalpine Lebanon; Amanus, and northward.

40. E. denticulata, Lam. ♃ .3 to .5, glabrous; stems thick, ascending, at length naked below, and marked with scars of leaves, sometimes sparingly branched below umbel. Leaves sessile, fleshy, with thin, scabrous, cartilaginous margin, *obovate-cuneate to rhombic-obovate*, .04 to .01 long, mucronate. Rays of umbel 5-7, twice 2-3-forked; umbellar and floral leaves *elliptical to orbicular-reniform ;* involucre hemispherical, red, with glands .006 broad; lobes ovate, ciliate; glands *purple*, broader than long, *truncate, pectinate-dentate ;* capsule *triquetrous-ovate*, .01 long, *truncate at base*, obsoletely grooved, carpels keeled; seed oblong, .005 long, obtuse, *tetragonal, with elevated, anastomosing-vermicular wrinkles and irregular pits ;* caruncle *stipitate*, conical, wrinkled-pitted, two-thirds as long as seed — April and May — Stony hillsides; middle to subalpine zones of Amanus, Kurd Dagh, Akher Dagh, and northward.

FIG. 330.



Inflorescence of Euphorbia denticulata.

41. E. biglandulosa, Desf. ♃ .3 to .5, glabrous; stems thick, erect, striate-sulcate, simple or sparingly branched below umbel. Leaves sessile, fleshy, entire, *lanceolate*, .02 to .05 long, *prickly-pointed ;* the upper cauline and umbellar oblong-ovate to ovate. Rays of umbel numerous, 1-2-forked; floral leaves *turning pink, reniform to rhombic-ovate, and cordate-ovate*, mucronate; involucre campanulate, *pink*, with glands .005 broad, lobes large, ovate, ciliate-denticulate; glands transversely oblong, *horns thick, lobulated, lobules capitate ;* capsule triquetrous-ovate, .006 to .008 long, *punctate*, grooved, carpels rounded; seeds white, oblong-tetragonal, *smooth*, caruncle depressed, lobulate-plicate — May and June — Mountains near Aintâb, and northward.

2. BUXUS, L. Box.

Flowers monœcious. Perigonium 1-bracted at base, sepals 4, in unequal, alternating pairs, one outer and one inner. *Staminate flowers :* stamens 4, inserted on receptacle, opposite the sepals; anthers 2-celled, with a thickened connective, pollen-grains not reticulate. *Pistillate flowers:* sepals each with three scales at base; ovary 3-celled, cells 2-ovuled; styles 3, short, thick, toward tip grooved and stigmatose at inner face; capsule leathery, 3-beaked with persistent styles, 3-celled, loculicidally 3-valved, valves 2-horned by the division of the styles, cells 2-seeded; seeds pendulous, albuminous — Shrubs, with leathery, evergreen, opposite leaves, and flowers clustered in axils.

B. longifolia, Boiss. ♄ .6 to 1 or more, glabrous. Leaves oblong-elliptical, .02 to .04 long, obtuse or retuse. Staminate flowers lateral, short-pedicelled; sepals oblong-lanceolate; anthers oblong-sagittate; horns of ovary almost as long as cell; capsule .01, long, horns recurved — June and July — Base of Cassius and Amanus; Antioch.

3. ANDRACHNE, L. Andrachne.

Flowers monœcious. Calyx more or less deeply 5-parted. Petals membranous, shorter than calyx, in pistillate flowers minute. Disk furnished with 5, free glands, inserted opposite the petals. *Staminate flowers:* stamens 5, filaments more or less connate at base, anthers short, 2-celled; pistil abortive. *Pistillate flowers:* corolla small or abortive; ovary resting on glands of disk, 3-celled, cells with 2 ovules, attached at central angle; styles 3, bifid or biparted, stigmas somewhat club-shaped; capsule consisting of 3, two-seeded carpels; seeds destitute of caruncle; embryo central, in fleshy albumen, radicle pointing toward hilum — Prostrate, delicate shrubs, with minute, alternate, stipuled leaves, and small white flowers.

1. A. telephioides, L. ♃ *Libbâneh.* .1 to .4, glabrous, glaucous; stems filiform, simple or branching, leafy. Leaves petioled, obovate to transversely oblong and elliptical, .002 to .01 long, stipules triangular-peltate, membranous, fringed. Flowers .003 broad, 3-1 in axils, short-pedicelled; sepals *rhombic*, white-margined; petals lanceolate, rather shorter than calyx; glands of disk two-lobed, one-third as long as petals; capsule depressed-glabrous — Summer — Common to middle mountain zones; Jordan Valley; Dead Sea; Sinai.

2. A. aspera, Spreng. ♄ *Kimmâsh* .1 to .4, *papillose-scabrous or hirtellous;* branches rigid, slender, simple or branching. Leaves petioled, *reniform to orbicular*, .002 to .01 long, cordate at base, the upper sessile, smaller. Flowers .003 broad, 3-1 in axils, short-pedicelled; sepals lanceolate, obtuse; petals shorter than calyx; glands of disk *in staminate flowers peltate-reniform, in pistillate obovate, truncate;* capsule depressed, hirsute — Spring — Dead Sea, Et-Tîh, and Sinai.

4. CROZOPHORA, Neck. Crozophora.

Flowers monœcious. Calyx 5-parted, valvular in bud. Disk glandular, 5-lobed. *Staminate flowers:* petals 5, alternate with sepals. Stamens 5-15, in 1-3 whorls, the filaments coalesced in a central column, the anthers 2-celled, with an excurrent, mucronate connective. *Pistillate flowers:* petals 5, narrow, sometimes 0; staminodes 5 or 0; ovary globular, 3-celled, cells 1-ovuled; styles 3, 2-fid or -parted, stigmatose on one side; capsule ovate-globular, consisting of 3, 1-seeded, 2-valved cells; seed tapering at tip, triquetrous, without caruncle; embryo central in oleaginous albumen; cotyledons broad, radicle short — Herbs or shrubs with stellate or scurfy hair, and alternate, stipuled leaves.

1. C. tinctoria, L. ⊙ *Faqqus-el-Humr.* .3, stellate - woolly, *not pannous*, grey; stem forked. Leaves long-petioled, rounded, subcordate, or short-cuneate at base, *rhombic-ovate*, .02 to .06 long, obtuse, repand-serrate *and often obscurely 3-lobed.* Staminate flowers *subdecandrous*; sepals linear-lanceolate, petals linear — Summer — Fields and

vineyards; common along coast, in lower mountains and interior plains.

2. C. verbascifolia, Willd. ⊙ .3, *densely pannous,* divaricately branched. Leaves long-petioled, rounded or subcordate at base, *ovate to oblong-ovate,* obtuse to acutish, repand. Staminate flowers *subpentandrous;* sepals and petals linear-lanceolate — Summer — Fields; coast and interior plains, especially northward.

3. C. obliqua, Vahl. ♄ *Sammâh. Summûh. Sabbagh. Nîl.* .5 to 1, *pannous, woody at base;* branches erect or ascending. Leaves short- or rather long-petioled, rounded or short-cuneate at base, ovate to ovate-lanceolate, acutish to acuminate. Staminate flowers subpentandrous, petals *obovate-lanceolate;* petals of pistillate flowers linear — Summer — El-Beida to Palmyra; south end of Dead Sea, and southward to Sinai and Egypt.

5. RICINUS, L. Castor Oil Plant. *Khurwa'.*

Monœcious. Perigonium 3-5-parted, valvate in bud. Petals 0. Disk 0. *Staminate flowers:* stamens very numerous, connate, forming a much-branched panicle; anthers of twin, globular cells. *Pistillate flowers:* ovary ovate-globular, 3-celled, cells 1-ovuled; style 3-parted, hirsute, stigmatose along its whole length; capsule of 3, 1-seeded, 2-valved cells; caruncle of seeds 2-lobed, albumen copious, oily — Shrubs with peltate, palmate-lobed leaves.

R. communis, L. ♄ Common Castor Oil Plant. *Khurwa'* 1 to 4; new shoots and petioles and peduncles glaucous, scurfy. Leaves peltate-palmate, 7-11-lobed, lobes lanceolate, dentate; stipules united, clasping. Flowers in axillary and terminal racemes, the staminate below and pistillate above; capsule oblong-ellipsoid, .01 long, echinate — Spring — Common on the sea coast, and interior plains; Jordan Valley.

Fig. 331.



A twig of Ricinus communis, L.

(*a*) A cluster of staminate flowers. (*b*) A cluster of pistillate flowers with forked styles. (c) A peltate-palmate leaf.

6. MERCURIALIS, L. Mercury.

Flowers diœcious. Perigonium 3-4-parted, valvate in staminate, and imbricate in pistillate flowers. Petals 0. *Staminate flowers:* stamens 8-12; anther-cells 2, joined by a globular connective. *Pistillate flowers:* ovary 2-celled, each cell with one ovule; style short: stigmas 2, roughened on their inner aspect; stamens 2-3, reduced to filaments; capsule 2, rarely 3-celled — Herbs, with colorless juice, and opposite, stipulate leaves.

M. annua, L. ⊙ Annual Mercury. .3 to .5; stem erect, branching, thickened at nodes. Leaves tender, glabrous, short-petioled, ovate to ovate-lanceolate, .02 to .06 long, crenate-serrate, slightly ciliolate. *Staminate flowers* clustered on axillary peduncles, which are longer than the leaves; pistillate flowers solitary or twin, sessile in the axils; capsules beset with tubercles terminating in bristle-like papillæ; seeds elliptical, pitted and tubercled — All the year — Fields and waste places; common everywhere.

Order XCV. URTICACEÆ, Juss. (Nettle Family.)

Plants with stipules, and monœcious, diœcious, polygamous, or perfect flowers, furnished with a regular perigonium, free from the 1-*celled*, 1-*ovuled ovary, which forms a* 1-*seeded fruit. The stamens as many as the lobes of perigonium or sepals, and opposite them* — Herbs, shrubs, or trees, the stipules often deciduous. The mode of growth of the different tribes of this principally tropical order differs widely.

* *Trees with perfect flowers, on last year's leafless branches.*

1. ULMUS. Fruit a samaroid. Anthers extrorse.

* * *Trees, with monœcious, diœcious, or polygamous flowers.*

2. CELTIS. Fruit a drupe. Anthers introrse.
3. MORUS. Fruit a compound berry, resembling a blackberry.
4. FICUS. Fruit a fleshy receptacle containing the flowers.

* * * *Shrubs or herbs, with monœcious or diœcious flowers. Fruit an akene.*

† *Filaments short, straight in bud. Ovule pendulous. Stigmas 2. Embryo coiled or bent.*

5. HUMULUS. Anthers erect. Leaves 3-5-lobed. Twining shrubs.
6. CANNABIS. Anthers drooping. Leaves 5-7-digitate-divided. Erect annuals.

† † *Filaments inflexed in bud. Ovule erect. Style or stigma 1. Embryo straight.*

7. URTICA. ⊙ ② ♃. Perigonium of fertile flowers of 2-4, separate or nearly separate sepals. Herbs with stinging hairs.
8. PARIETARIA. ♃ Perigonium of fertile flowers tubular or cup-shaped, enclosing the akene. Unarmed, perennial herbs.
9. FORSKAHLEA. ♃ Perigonium of fertile flowers 0, of staminate tubular, 1-lipped.

1. ULMUS, L. Elm. *Kharhafti. Buqîsá.*

Flowers perfect. Perigonium campanulate, 4-5-dentate, marcescent. Stamens 4-8, inserted at base of perigonium, filaments straight in bud. Ovary 2-beaked, stigmas 2, elongated, villous along their inner aspect. Fruit a samaroid, composed of a utricle, surrounded by

a membranous wing — Trees with leaves unequal at base, caducous stipules, and flowers preceding leaves, arranged in lateral clusters.

U. campestris, L. ♄ 6 to 15. Leaves ovate to oblong-lanceolate, .4 to .8 long, short-acuminate, serrate, pubescent or glabrous. Flower clusters subsessile, pedicels short; perigonium equally 5-cleft, lobes ciliate; stamens 4-5; samara obovate, .015 long, margin entire, notched at tip; seed near sinus — Flowering in spring — Aleppo, Aintâb, and northward.

2. CELTIS, L. Nettle-tree. Hackberry. *Mais.*

Flowers perfect, or by abortion polygamous. Sepals 5-6, ovate, imbricated in bud. Stamens 5-6, opposite the sepals, incurved in bud, straightening themselves elastically in flower; anthers introrse. Stigmas 2, long, papillose. Drupe globular-ovate, slightly fleshy; stone bony — Trees, with watery juice, alternate leaves, and quickly falling stipules. *Staminate flowers* solitary in axils; *pistillate* more or less clustered.

C. australis, L. ♄ Southern Hackberry. *Mais.* 10 or more. Leaves with rounded or wedge-shaped, oblique base, ovate-lanceolate, .1 to .15 long, long-acuminate, acutely serrate, soft-pubescent beneath. Fruiting peduncles much longer than petioles; drupe black, .01 long; seed netted, roughened — Spring — Common in cultivation as a shade tree. Spontaneous in lower mountain regions along coast, and in Jordan Valley.

3. MORUS, L. Mulberry. Sycamine. *Tût.*

Flowers monœcious rarely diœcious, arranged in spikes or heads. *Staminate flowers:* sepals 4; stamens 4, the filaments inflexed in bud. *Pistillate flowers:* sepals 4-5, ovate, concave, at length becoming succulent, and enclosing the 2-celled ovary; stigmas 2; fruit a *syncarpium*, composed of the capitate-spiked, by abortion 1-seeded, fleshy sepals, which have become coalesced by pressure; testa of seed hard, brittle; embryo hooked — Trees with milky juice, and alternate leaves.

Fig. 332.



Ripe fruit of a mulberry, showing the succulent sepals, and 2 stigmas.

1. M. nigra, L. ♄ Sycamine. *Tût-Shâmi.* 8 to 10. Leaves cordate-ovate, lobed or undivided, .1 to .15 long. *Fruiting spikes subsessile;* fruit oblong, .02 to .03 long, *acid; margin of sepals and stigmas villous* — Early summer — Cultivated everywhere for its delicious berries.

2. M. alba, L. ♄ Mulberry. *Tût beledi.* 5 to 8. Leaves cordate-ovate, usually oblique at base, entire, serrate, or lobed, .1 to .2 long. Peduncles as long as fruiting spikes; fruit oblong, .01 to .015 long, *sweetish, insipid; margin of sepals glabrous; stigmas glabrous or short-papillose* — Early summer — Cultivated everywhere for its leaves, which are used as food for silk-worms.

4. FICUS, L. Fig. *Tîn.*

Flowers monœcious or diœcious, inserted on the inner wall of a fleshy, hollow, globular-pyriform receptacle, which is bracted at base,

umbilicate at apex, and has a narrow, open mouth, furnished with scales. *Staminate flowers:* sepals 3-5; stamens 3-6, filaments straight in the bud. *Pistillate flowers:* perigonium 5-fid; ovary 1-celled, style lateral, stigmas 2 or 1; fruit consisting of the fleshy receptacle, and minute, crustaceous, 1-seeded utricles; testa of seed membranous: embryo incurved — Trees with milky juice and alternate leaves, appearing with fruit.

F. Carica, L. ♄ Fig. *Tîn.* 3 to 5. Leaves deciduous, petioled, scabrous at upper surface, pubescent or velvety at lower, ovate, cordate at base, 3-5-lobed, repand, rarely undivided, .1 to .3 long and broad. Figs solitary, in or above axils, *on the last year's branches*, short-peduncled, pyriform to globular, tapering at base to a stalk as long as fig, or destitute of stalk — Summer — Common in the wild state, and cultivated in many selected varieties for its usually sweet, sometimes somewhat acid fruit. Of the wild varieties there grow in Syria and Palestine:—

Var. **genuina**, Boiss. Leaves 3-5-lobed, or rarely undivided.

Var. **riparium,** Haussk. Leaves 5-7-lobed, lobes oblong-spathulate.

Var. **rupestris,** Haussk. Leaves undivided, ovate to oblong, obtuse, leathery. Fruit pyriform, more or less puberulent.

Var. **globosa,** Boiss. Leaves trilobed or undivided. Fruit globular, puberulent, destitute of stalk.

2. F. pseudosycomorus, Decaisn ♄ *Abu-Ḥammâd. Zamyûk. Ḥammât. Dablût.* 3; young branches pruinose. Leaves deciduous, petioled, ovate to ovate-orbicular, cordate at base, .05 to .15 long, obtuse, *crenate-dentate or lobuled*, some undivided, others repand to trilobed, green and scabrous at upper surface, pale and tomentellous at length glabrescent-scabrous at lower. Figs solitary on last year's branches, out of axils, short-peduncled or sessile, turbinate, puberulent — April — El-Ghôr; Dead Sea, and southward to Sinai and Egypt.

3. F. Sycamorus, L. ♄ Sycamore. *Jummeiz.* 8 to 15 high, and often 20 broad. Leaves *persistent*, petioled, ovate-subcordate, .1 to .2 long, obtuse, *entire*, glabrous except the sparingly hirtulous nerves of the lower surface. Figs on *tortuous, leafless twigs on the trunk or older branches*, turbinate, .02 long, short-stipitate, tomentellous — Summer — Common, especially in and about towns.

F. religiosa, L., the Banyan, F. elastica, Nois, the India Rubber Tree, and F. Benghalensis, L. are somewhat cultivated about towns.

Fig. 333.



Branch with fruiting twigs.

5. HUMULUS, L. Hop.

Flowers diœcious. *Staminate flowers* racemed; sepals 5; stamens 5, inserted at base of sepals, erect, with a very short filament; anthers ob-

long, 2-celled, apiculate. *Pistillate flowers* in aments, two at base of each leaf-like bract; sepal 1, surrounding the 1-ovuled ovary; stigmas 2, subulate, elongated, pubescent; strobile ovate, with enlarged, leafy bracts; nutlet nearly globular, erect, pericarp hard, brittle; embryo spiral -- Perennial, climbing herbs, with opposite leaves.

H. Lupulus, L. ♃ Stems sarmentose, climbing. Leaves petioled, retrorsely scabrous at upper surface, serrulate, cordate, .05 to .1 long, 3-5-palmatisect into ovate to ovate-lanceolate, acuminate lobes, or undivided. Staminate panicles peduncled, opposite; bracts short-lanceolate, sepals oblong; pistillate aments opposite, peduncled, developing into ovate strobiles, .015 to .02 long; bracts much enlarged, scarious, beset at outer aspect of base with fragrant, yellow glands — August — Galilee; Antilebanon; Damascus.

The strobiles used to impart their bitter taste and aroma to beer.

6. CANNABIS, Tourn. Hemp. *Qinnab.*

Flowers diœcious. *Staminate flowers* racemed; sepals 5; stamens 5, inserted at base of sepals, filaments nodding, anthers pendulous, 2-celled. *Pistillate flowers* spiked-clustered; the place of a perigonium taken by a small, folded, persistent bract, inflated at base, enclosing the globular, 1-ovuled ovary; stigmas 2, elongated, filiform, pubescent, connate at base; nutlet ovate, erect, pericarp hard, brittle, apparently 2-valved but nearly indehiscent; embryo falcate-folded — Annual herbs, with glutinous-inflorescence.

C. sativa, L. ⊙ 1 to 2, scabrous. Leaves digitate, with 5-7, linear-lanceolate, acuminate, coarse-serrate divisions. Staminate racemes panicled; pistillate clusters subsessile, forming a terminal, leafy spike -- Summer — Cultivated everywhere for the fibres of the bark, out of which cordage is made.

The dried flowering tops of the pistillate plants, from which the resinous exudation has not been removed are the officinal *Cannabis Indica*, or *Indian Hemp*, called in India *Gunjah*. *Bhang* is the dried, coarsely broken, larger leaves, mixed with a few of the fruits. *Churrus* is the resin.

7. URTICA, L. Nettle. *Qurreis.*

Flowers monœcious or diœcious, in whorled racemes or spikes, or close clusters. *Staminate flowers:* sepals 4, spreading; stamens 4, opposite sepals, inserted at their base; anthers oblong-reniform; rudimentary ovary cup-shaped. *Pistillate flowers:* sepals 4, the outer pair much smaller, the inner flat; stigma sessile, brush-like; akene oblong, compressed, enclosed in the enlarged, persistent sepals—Herbs, with opposite leaves and stinging hairs.

1. U. urens, L. *Hurreiq. Zaghlîl.* ⊙ .3 to .5, *monœcious;* stem branching from base, erect. Leaves ovate to oblong, acutely incised-dentate, limb *a little longer than petiole;* stipules two, between petioles. Staminate racemes axillary, *simple, generally shorter than petiole*, less numerous than pistillate — Spring -- Fields and waste places; common everywhere.

2. U. dioica, L. ♃ .5 to 1, *diœcious ;* stems erect, nearly simple. Leaves oblong-lanceolate, *acuminate*, subcordate at base, coarse-serrate, *limb much longer than petiole ;* stipules 2 between petioles. *Flowers in clusters, forming axillary, interrupted racemes*, much longer than petioles, flowering to base — Spring — Lebanon and Hermon to subalpine regions; Aintâb.

3. U. pilulifera, L. ⊙ or ② .6 to 1 or more, *monœcious*, occasionally glabrous; stems erect, usually branching. Leaves ovate to cordate, coarse-toothed; stipules two between petioles. Staminate and pistillate inflorescence in the same axils, or the lower axils having only staminate flowers; staminate flowers in spike-like racemes on long peduncles; *pistillate flowers in globular heads* .01 in diameter, one or rarely two on a peduncle, at length nodding — Spring — Common everywhere below subalpine regions.

4. U. membranacea, Poir. ⊙ .3 to .4, *monœcious or diœcious ;* stems erect or ascending, branching. Leaves ovate, with cordate, rounded, or cuneate base, incised-serrate; stipules *solitary between petioles.* Flowers in twin, axillary spikes; the staminate lowermost, on a non-dilated rachis, shorter than petioles; the pistillate uppermost, *inserted on the upper surface of a dilated, membranous rachis* — Spring — Fields and waste places of coast, and lower mountain regions; common.

8. PARIETARIA, L. Pellitory. *Ḥashîshat-el-Qazâz.*

Flowers polygamous, the perfect, staminate, and pistillate intermixed in the same axillary, involucrate-bracted cluster. *Perfect flowers :* perigonium of 4, nearly equal sepals, slightly united at base, spreading before flowering, concave, growing after flowering; stamens 4, free, inserted at base of sepals, transversely fluted, inflexed before flowering, straightening themselves elastically at maturity, and thus scattering their pollen. Stigma sessile, brush-like. *Staminate flowers* like perfect, but lacking an ovary. *Pistillate flowers :* perigonium tubular, 4-toothed at apex, persistent, not growing after flowering; style exserted, stigma tufted; akene ovate, enclosed in the persistent perigonium — Annual or perennial, tender herbs, not furnished with stinging hairs, with alternate leaves. Roots generally growing in the crevices of walls or rocks.

1. P. officinalis, L. ♃ .3 to .5, pubescent; stems nearly simple. Leaves ovate to oblong-lanceolate, *tapering* at base. Bracts *free, not decurrent ;* flowers in the forks pistillate, the others perfect; perigonium campanulate, *growing little*, as long as stamens — Summer — Roadsides and walls; less common than the next.

2. P. Judaica, L. ♃ *Ḥashîshet-er-Rîḥ.* .3 to .5, pubescent; stems *more or less indurated below*, diffuse or ascending, simple or branched. Leaves *wedge-shaped at base, ovate* to ovate-lanceolate, more or less acute. Bracts *connate at base*, somewhat decurrent; flowers in the forks pistillate, the others perfect; perigonium *growing after flowering, at length longer than stamens* — Spring — On walls, and fissures of rocks; common everywhere. Probably a mere variety of *P. officinalis*, L. Varies with petioles from one-sixth to one-third as long as lamina.

3. P. Lusitanica, L. ⊙ .3 to .5, puberulent; stems filiform, prostrate, branching. Leaves .005 to .015 long, ovate, *acute at both*

ends. Cymes dense, ∞-flowered; bracts *scarcely enlarging in fruit;* perfect flowers few, sterile, the rest pistillate; the fruiting perigonium scarcely enlarging, *tawny, indurated,* with connivent lobes — March to May — Walls and shady rocks; coast and coast-ranges.

4. P. alsinefolia, Del. ⊙ *Lizzeiq. Wudein-el-Fâr.* .2 to .4, puberulent; stems filiform, flaccid, diffuse. Leaves .003 to .01 long, *rounded* at base, ovate. Cymes axillary, *3-flowered, the lower perfect, sterile with a small lanceolate bract,* the other two pistillate with *three cordate-ovate, membranous bracts,* .003 long in fruit; perigonium growing little in fruit, with connivent lobes — March to May — Rocky and shady places in the mountains of the interior from Aleppo, Palmyra and Damascus to Hebron and et-Tîh, and southward to Sinai and Egypt, and eastward.

9. FORSKAHLEA, L. Forskahlea. *Lizzeiq.*

Flowers monœcious, enclosed in an involucre of 4-6 leaves which are fleecy on their inner surface, the outer more numerous, staminate, the inner pistillate; more rarely the pistillate alone in 2-leaved involucres. *Staminate flowers:* perigonium tubular below, dilated above, 1-lipped, somewhat 3-toothed; stamen 1. *Pistillate flowers:* perigonium 0; ovary elliptical, fleecy, tapering into a filiform, hispid stigma; akene straight, fleecy, compressed, albumen little — Perennial herbs or shrubs, with alternate leaves, and free, lateral stipules.

F. tenacissima, L. ♃ *Lizzâq. Lizzeiq.* .1 to .6, appressed woolly, and beset with hooked, stinging hairs; stems simple or branching. Leaves ovate-orbicular to rhombic-ovate, .01 to .02 long, short-petioled, cuneate at base, coarse-toothed toward apex, green at upper surface and white-woolly at lower. Involucres axillary, globular-turbinate, nearly sessile, 4-1 in a cluster, some with 4-5, lanceolate, acute, silky-hispid involucre-leaves, others with 2 — March — Around Dead Sea, and southward to Sinai and Egypt.

Order XCVI. CYNOCRAMBEÆ. Nees.
(Cynocrambe Family).

Flaccid, prostrate herbs, growing in crevices of rocks and walls, with monœcious flowers, and a fruit somewhat fleshy in the recent state, becoming a dry, indehiscent nutlet — *Staminate flowers:* stamens 8-20 or fewer, inserted at bottom of perigonium. *Pistillate flowers:* perigonium tubular-funnel-shaped, adherent to the ovary, the limb club-urn-shaped, 4-2-lobed, soon caducous. Ovary 1-celled, bulging outward, nearly globular; style linear-club-shaped, lateral on account of the inflated ovary, almost basilar, papillose from middle; ovule 1, basilar, campylotropous; seed globular, testa thin, embryo horseshoe-shape, vertical in axis of farinaceous albumen.

CYNOCRAMBE, Diosc. (Theligonum, L.). Cynocrambe.

Staminate flowers: lobes of perigonium valvate in bud, at length revolute; filaments capillary, anthers linear, bilocular, versatile. *Pistil-*

late flowers: limb of perigonium hyaline; style deciduous with limb of perigonium after flowering; pericarp of nutlet thickish, beset with little warts containing needle-like crystals, and between the warts longitudinal, naked lines — Annual herbs, with hyaline stipules.

C. prostrata, Gærtn. ⊙ .1 to .3. Leaves petioled, ovate-rhombic, .01 to .03 long, scabrous-margined, the lowest opposite, the upper, on account of the small size or abortion of their opposites, alternate; stipules entire or dentate, those of opposite leaves connate, of the others clasping. Flowers minute, sessile, green; the staminate twin, toward tip of branches, opposite the alternate leaves, naked; the pistillate at axils of leaves, especially of the opposite ones, three or less in a cluster, bracted — May and June — Common.

ORDER XCVII. **PLATANACEÆ,** Lindl. (PLANE TREE FAMILY).

Trees with watery juice, alternate, palmately lobed leaves, sheathing stipules, and monœcious flowers in separate and naked spherical heads, destitute of calyx and corolla; the fruit club-shaped, 1-*seeded nutlets, furnished with bristly down along the base* — Perigonium reduced to minute, hairy scales, often 0. An order with only one genus.

PLATANUS, Tourn. PLANE TREE. BUTTONWOOD. *Dilb.*

Staminate flowers of numerous stamens, with club-shaped, little scales intermixed; filaments short, anthers 2-celled, oblong, with a truncate-peltate connective. *Pistillate flowers,* consisting of obconical, 1-celled ovaries, hairy at base, ending in an elongated-subulate style, stigmatic at apex, these flowers intermixed with club-shaped scales. Nutlets coriaceous, small, tawny-hairy below, containing a single, orthotropous, pendulous seed. Embryo straight in axis of thin albumen or albumen 0 — Trees; peduncles terminal on twigs, the leaves of which are not yet developed, elongated, pendulous, moniliform, bearing 3-7, subsessile heads.

P. Orientalis, L. ♄ Oriental Plane Tree. *Dilb.* 20 or more, bark scaling off in sheets. Leaves woolly beneath then glabrescent, cuneate or truncate or subcordate at base, more or less deeply 3-5-cleft into lanceolate, lobed or dentate segments — Early spring — By water, usually fountains or torrents or rivers, from el-Ghôr to subalpine regions.

ORDER XCVII. **JUGLANDACEÆ,** Lindl. (WALNUT FAMILY).

Trees with alternate, pinnate leaves, and no stipules; flowers monœcious, the staminate in catkins (aments) with an irregular perigonium adnate to the bract; the pistillate solitary or in a small cluster or spike, with a regular, 3-5-*lobed perigonium adherent to the incompletely* 2-4-*celled,* 1-*ovuled ovary. Fruit a dry drupe, with a crustaceous or bony nut-shell, containing a large,* 4-*lobed, orthotropous seed* — Albumen 0. Cotyledons fleshy, crumpled, oily, 2-lobed;

radicle superior, short. Petals sometimes present in the fertile flowers — A small family of important, nut and timber trees.

JUGLANS, L. Walnut. *Jauz.*

Staminate catkins simple, lateral, pendulous from the twigs of the preceding year, perigonium 3-6-lobed; stamens in 2-∞ rows, the connective produced beyond the anthers; filaments free, very short. *Pistillate flowers* on a peduncle at the end of the branches; perigonium double, connate with ovary to base of style, consisting of a 4-toothed calyx, with 4 small petals at sinuses; styles 2, very short; stigmas club-shaped, fringed; pericarp fleshy, indehiscent, drying and rupturing irregularly at maturity, and separating from nut. Nut irregularly wrinkled, 2-valved.

J. regia, L. ♄ 10 or more, forming a hemispherical comus. Leaves glabrous, with 5-6 (rarely 2) pairs of ovate to oblong, entire, fragrant leaflets, slightly tapering at tip. Nut ovate to globular, .02 to .04 in diameter, with 4 partitions; scales of embryo in 2 rows — Spring — Cultivated everywhere, usually by the village fountains, for its delicious nuts, and its valuable timber. One of the noblest of trees.

Order XCIX. **BETULACEÆ,** Endl. (Birch Family.)

Monœcious trees or shrubs, with alternate, simple, mostly straight-veined leaves, both kinds of flowers in scaly catkins, and no involucre to the naked, 1-*celled and* 1-*seeded, often winged, small nut — Staminate flowers.* Scales pedicelled, appendaged, usually 3-flowered. Perigonium scale-like, or a calyx with 4-5 lobes or sepals. Stamens 2-4, inserted at base of perigonium. *Pistillate flowers.* Scales imbricated, 2-3-flowered. Perigonium 0. Ovary 2-celled, with 1 ovule in each cell, suspended from a point a little below the apex of the partition; stigmas 2. Fruit indehiscent. Testa membranous, albumen 0, embryo straight — Stipules often early deciduous.

ALNUS, Tourn. Alder. *Naght.*

Staminate flowers generally 3 under each shield-shaped scale, the lower margin of scale 4-lobed. Perigonium 4-lobed or 4-sepaled. Stamens 4, filaments short, free, anthers 2-celled. *Pistillate flowers* in ovoid or oblong catkins, the fleshy, ovate scales 2-flowered at axil, growing larger and woody in fruit, cuneate-obovate, persistent, 4-appendaged. Ovary minute; stigmas filiform. Nutlets flattened, wingless, or winged — Trees or shrubs flowering in late winter and early spring.

A. Orientalis, Dec. ♄ *Naght.* 4 to 8. Leaves long-petioled, wedge-shaped, rounded, or somewhat heart-shaped and often oblique at base, ovate-oblong to elliptical, obtuse, acute, or acuminate, more or less irregularly crenate-dentate or doubly serrate, glabrous at upper surface,

more or less pubescent at axils of nerves of lower. Pistillate catkins 1-3 from a bud, .02 long, .012 in diameter, longer than peduncles; nutlets wingless — February and March — Common along banks of streams to 1500 m.

ORDER C. **CUPULIFERÆ**, Rich. (OAK FAMILY).

Trees or shrubs, with alternate and simple, straight-veined leaves, deciduous stipules, and monœcious flowers. Staminate flowers in catkins (aments), (or capitate-clustered in Fagus); perigonium of 5-9, *unequal sepals, or* 0; *stamens* 5-20. *Pistillate flowers solitary or clustered, furnished with an involucre which forms a cup or covering to the* 1-*celled,* 1-*seeded nut. Perigonium adnate to ovary, the limb denticulate, often caducous* — Ovary 2-6-celled, the cells 1-2-ovuled. Styles 2-6, connate at base. Fruit formed by the involucre enclosing the pericarp, or sheathing its base. Embryo straight, radicle looking toward the hilum. Albumen 0.

1. CARPINUS. Strobile of fertile flowers loose: nutlets (.003 long), each subtended by two leafy bractlets.
2. OSTRYA. Strobile of fertile flowers dense; a pair of nutlets (.003 long) at base of each deciduous bract, each surrounded by a bladdery bag.
3. CORYLUS. Fertile flowers 1-few on a leafy twig; nut (.015 to .02 long) enclosed in a tubular, leafy involucre, torn-fringed at tip.
4. QUERCUS. Fertile flowers solitary or 2-3 in a cluster; fruit an acorn, *i.e.* a 1-seeded nut, enclosed in a cupule composed of imbricated bracts.
5. FAGUS. Fertile flowers 2-1, enclosed in an urn-shaped, 4-lobed involucre, connate with bases of numerous, linear bracts; nut triquetrous, enclosed in enlarged involucre.

1. CARPINUS, Tourn. HORNBEAM. IRON WOOD.

Staminate flowers in cylindrical, bracted catkins, bracts simple, ovate. Stamens 6-12, inserted in the axil of the bract, anthers with two, separate cells borne on the forks of the short filaments. *Pistillate flowers* in ovoid, loose strobiles with 3, small, deciduous bracts around each pair of open, leaf-like bractlets which form an involucre for the single flower. Perigonium adherent to ovary, limb minute, 6-toothed. Ovary with 2, 1-ovuled cells. Stigmas 2, filiform. Nutlet by abortion 1-celled, at base of open involucre, ribbed — Small trees.

C. Duinensis, Scop. ♄ 4 to 6. Leaves ovate to elliptical, acute, doubly serrate, pubescent along nerves of lower surface Catkins terminal, the sterile sessile, the fertile peduncled, ovoid, .02 to .03 long, .02 in diameter; leaves of fruiting involucre one-sided, ovate, serrate, .015 long, .01 broad; nutlet .003 long, ovate, mucronulate — Spring — Lower and middle zones of Amanus, and northward.

2. OSTRYA, Micheli. HOPHORNBEAM. IRON WOOD.

Staminate flowers in drooping, cylindrical catkins. Stamens 6 to 12, inserted at axil of bract; filaments short, forked, each branch bearing a 1-celled anther with a hairy tip. *Pistillate flowers* in a hop-like strobile, a pair at the axil of each deciduous bract. Perigonium adherent to the nutlet, with a short, bearded tip, the whole enclosed in

an urn-shaped bractlet, which in fruit becomes a closed, bladdery, oblong bag, very much larger than the small, smooth nutlet, which is by abortion 1-seeded — Shrubs or small trees.

O. carpinifolia, Scop. ♄ 3 to 6. Leaves ovate to oblong, short-petioled, rounded or subcordate at base, acuminate, sharply-serrate, rusty-pubescent at under surface along nerves. Strobiles oblong, .02 to .04 long, pendulous; utricle white, .013 long, elliptical, mucronate, four times as long as nutlet — May — Wooded zones of Cassius, Amanus, Akher Dagh, and northward.

3. CORYLUS, L. Hazel-Nut. Filbert. *Binduq.*

Staminate flowers in drooping, cylindrical catkins, single or fascicled from scaly buds of the axils of the preceding year. Stamens 8, each with a 1-celled anther, bearded at tip, the short filaments inserted along a crest at the base of the suture of the pair of bractlets, which are more or less adherent to the inner face of the wedge-shaped, imbricated bract. *Pistillate flowers* few in a scaly bud, which develops into a short, leafy twig, the scales imbricated, the lower sterile, the upper 2-flowered, each a single ovary surrounded by an involucre of minute, fringed-tipped, villous scales coherent at base. Perigonium connate with ovary, with a minute, denticulate limb. Nuts solitary or 2-3 in a cluster, surrounded by the leafy, much enlarged, torn-fringed involucre; pericarp woody; kernel edible — Shrubs or small trees.

C. Avellana, L. ♄ 3 to 6. Stipules oblong, obtuse; leaves short-petioled, cordate, nearly orbicular, doubly serrate, short-acuminate, pubescent at lower surface. Involucre in 1 row, tubular-campanulate in fruit; nut .01 to .015 long, ovoid — Spring — Wooded zones of Cassius, Amanus, and northward, and eastward.

4. QUERCUS, Tourn. Oak. *Sindiân.*

Staminate flowers in slender, naked, drooping, bractless catkins. Perigonium of 5-9, linear-oblong, ciliated sepals. Stamens 5-20. Anthers 2-celled. *Pistillate flowers* globular, solitary, or somewhat clustered, enclosed in a cupule, composed of imbricated bracts; the tube of the perigonium adherent to the ovary; the limb small, denticulate, superior. Ovary 3-celled below, 1-celled above; cells 2-ovuled. Styles 3 (occasionally 4). Fruit an acorn, *i.e.*, a 1-celled, 1-seeded nut, enclosed at base in a cupule — Trees or shrubs, with greenish-yellow, inconspicuous flowers, the sterile catkins usually several from the same scaly bud — These species of oak are liable to bear galls.

* *Styles short, dilated-flattened at tip. Fruit maturing in one year.*

† *Leaves deciduous from autumn to spring, not evergreen.*

‡ *Leaves membranous, sinuate, or pinnatilobed, lobes muticous.*

1 Q. sessiliflora.

‡ ‡ *Leaves undivided, crenate or dentate, teeth callous or mucronate.*

2 Q. Lusitanica.

† † *Leaves thick, evergreen, lasting several years.*

3 Q. Ilex.

* * *Styles linear, subulate at tip. Fruit taking two years to mature.*

† *Leaves evergreen, lasting for several years.*

4 Q. coccifera.

† † *Leaves falling from late autumn to early spring.*

5 Q. Cerris, 6 Ehrenbergii, 7 Ægilops, 8 Look, 9 Libani.

FIG. 334.



(*a*) A cluster of sterile catkins. (*b*) A single staminate flower enlarged. (*c*) Transverse section of the 3-celled ovary, each cell containing 2 ovules. (*d*) A young seed with its abortive fellow attached to its base. (*e*) An acorn, showing the nut and its cupule. (*f*) Longitudinal section of the nut, showing the cotyledons and superior embryo.

1. Q. sessiliflora, Sn. ♄ A tall tree. Leaves petioled, truncate to cuneate at base, obovate-oblong, .1 or more long, glabrous or glabrescent, more or less deeply sinuate-pinnatilobed, the lobes muticous. Peduncles scarcely as long as petioles or almost 0; scales of cupule tomentellous, ending in a short, triangular, appressed appendage, or short-lanceolate, obtuse — Spring.

Var. **Cedrorum**. A.D.C. Leaves oblong, often more deeply pinnatifid — Lebanon above Cedars.

Var. **pinnatifida,** Boiss. Leaves pinnatifid beyond middle or near to rachis — Ḍannîyeh (Lebanon).

2. Q. Lusitanica, Lam. ♄ *Mellûl. Ballût.* 5 to 10. Leaves lasting late into winter but falling before the new twigs are developed, somewhat leathery, petioled, .05 to .2 long, rounded or truncate at base, elliptical to oblong or ovate-oblong or sometimes sublanceolate,

glossy at upper surface, stellate-pubescent at lower, dentate or crenate, the teeth or scallops acutish or callous. Acorns short-peduncled or sessile, solitary or few in a cluster; scales of cupule tomentellous, appressed, more or less convex lengthwise at back, triangular-ovate to short-lanceolate — Spring —

Var. **genuina,** Boiss. Leaves oblong-elliptical, lower surface pale and glabrous to stellate-pubescent, margin dentate — Lower and middle mountain zones.

Var. **Boissieri,** A.D.C. Leaves glabrous or glabrescent at lower surface, margin regularly acute-dentate — Lebanon; Cassius.

Var. **petiolaris,** A. D. C. Leaves long-petioled, with few scallops or entire, glabrescent at lower surface — Lower and middle mountain zones.

Var. **latifolia**, Boiss. Leaves broad-ovate, wavy, obtuse-crenate or nearly entire, usually tomentellous at lower surface; glands often large — Lebanon and Antilebanon.

This species is peculiarly liable to bear galls.

3. Q. Ilex, L. ♄ A low tree, bark not corky. Leaves leathery, evergreen, white-tomentellous at lower surface, glabrous at upper, short-petioled, ovate, oblong, or elliptical-lanceolate, acute-dentate or entire, acute or obtuse. Anthers mucronulate; fruiting racemes short, short-peduncled; scales of cupule appressed, woolly, triangular-ovate, obtuse — Spring — Syrian coast.

4. Q. coccifera, L. ♄ ♄ *Sindiân.* 2. to 10. Leaves *evergreen*, short-petioled, firm, ovate to oblong, .02 to .04 long, rounded or cordate at base, generally glabrous, *spiny-toothed*, or nearly entire, flat or wavy. Acorns solitary or twin; cupules hemispherical; scales more or less velvety, regularly imbricated, small, the lowermost ovate, the intermediate oblong-lanceolate, the uppermost linear, erect, divergent, or reflexed — Spring.

Var. **genuina,** Boiss. Shrub or small tree, with intricate branches, small, ovate, wavy leaves with prickly teeth, and short-echinate cupule.

Var. **integrifolia,** Boiss. Shrub. Leaves small, scarcely denticulate or entire; scales appressed or short-echinate at tip.

Var. **calliprinos,** Boiss. Shrub or tree; leaves flat, often larger than in type; scales of cupule erect, more or less appressed.

Var. **pseudococcifera,** Boiss. Tall shrub to large tree; leaves flattish, oblong, usually cordate at base; scales of cupule more or less spreading or recurved — The oak trees planted by tombs are of this variety. It includes var. Palæstina, Boiss. (*Q. Palæstina, Ky.*).

5. Q. Cerris, L. ♄ *Ballût. Likk.* 5 to 15. Leaves membranous, petioled, glabrescent at upper surface, pubescent at lower, oblong, more or less deeply pinnatilobed, the lobes nearly entire, oblong to triangular, obtuse to acute, tip often callous or mucronate. Acorns 1-3 together, subsessile, .035 in diameter, scales of hemispherical, tawny echinate cupule pubescent, *elongated*, the lower lanceolate, spreading,

the upper *linear-subulate, erect or spreading-reflexed, and contorted* — Spring — Woods; lower and middle to subalpine regions — Many kinds of galls grow on this species.

Var. **pseudocerris,** Boiss. Leaves more or less pinnatisect or parted into linear, entire, or 3-5-lobuled lobes; scales of cupule somewhat thicker, convex at outer face — Mt. Cassius.

6. Q. Ehrenbergii, Ky. ♄ A medium sized tree. Leaves membranous, petioled, tomentellous on each face with stellate hairs, short-ovate in outline, pinnatisect or -partite into unequal, oblong, usually acute and apiculate lobes, which are entire or dentate toward tip. Acorns large, solitary, subsessile; scales of cupule loosely imbricated, tomentellous, all erect and short, the lower and intermediate ovate to oblong, acute or apiculate, the uppermost linear, scarcely longer than the others; nut once and a half as long as cupule — Middle zone of Lebanon and Antilebanon.

7. Q. Ægilops, L. ♄ Valonia Oak. 5 to 15; trunk stout; comus spherical. Leaves somewhat leathery, late in falling, petioled, glabrescent and glossy at upper surface, tomentellous-canescent at lower, rounded-truncate to cordate at base, ovate to oblong, unequally coarse-serrate, teeth acuminate or mucronate. Acorns solitary or 2-3 in a cluster, sessile; cupule globular, .02 to .04 in diameter, scales thick, tomentellous, ovate-lanceolate, the upper or all elongated, spreading-recurved, the nut 2-3 times as long as cupule — Common to middle mountain zones. The cupules of this species are largely used in tanning, and form an important article of commerce.

Fig. 335.

Acorn of Quercus Ægilops.

Var. **Ithaburensis,** Boiss. Leaves *broad-ovate*, teeth shorter than in type. All the scales recurved — Galilee; Gilead; Baniâs; Amanus.

Var. **Pyrami,** Boiss. Later leaves more or less deeply lobed to lyrate, the terminal lobe broader, rounded, cordate at base. Lower scales of cupule ovate, erect, the upper linear-lanceolate, recurved — Mouth of the Pyramus.

8. Q. Look, Ky. ♄ A medium sized tree or shrub. Leaves short-petioled, rigid, wavy, stellate-puberulent at under surface, coarsely crenate-dentate, teeth mucronate. Acorns short-peduncled, solitary or twin; cupule somewhat top-shaped, scales tomentellous, the lowest ovate, somewhat appressed, the intermediate ovate-lanceolate, *inflexed at tip*, the upper elongated, linear, hooked-reflexed — Spring — Flanks of Hermon near Rasheya; Wadi-el-Ḥarir; Ḥaurân; Wadi Ibrîsah (Lebanon); Amanus.

9. Q. Libani, Oliv. ♄ Low tree or shrub, the branches and petioles glabrous. Leaves deciduous, the mature ones glabrous on both sides, glossy at upper surface, petioled, rounded or cuneate at base, lanceolate, .1 to .2 long, .02 to .05 broad, coarse-dentate to serrate, teeth ascending, triangular, *mucronate-aristate.* Acorns solitary, nearly sessile. Scales of cupule greyish, minutely puberulent, all appressed, *rhombic-ovate*, the *upper narrower but not longer;* nut slightly exserted — Spring — Woods of middle zone of Lebanon, Cassius, Amanus, and northward.

5. FAGUS, Tourn. Beech.

Staminate flowers in globular, long-peduncled aments, enclosed in an involucre of minute, deciduous scales. Perigonium 5-6-fid. Stamens 10-15. *Pistillate flowers* usually 2 in an urn-shaped, 4-lobed involucre, connate with bases of numerous, linear bracts. Perigonium adnate to ovary, limb small, fringed; ovary triangular, 3-celled, with 2 ovules in each cell; styles 3, linear, stigmatose along their inner border. Nuts enclosed in the enlarged, ovoid, 4-parted, woody, soft-prickly involucre, twin or (by abortion) single, triquetrous, crowned with the limb of the perigonium, usually 1-seeded. Pericarp leathery. Cotyledons fleshy, edible, furnished with irregular prominent folds within, somewhat united — Trees or shrubs with a close, smooth, ash-grey bark, horizontal spray, the flowers appearing with the leaves.

F. sylvatica, L. ♄ 5 to 20, comus oblong-ovate. Buds glabrous, glossy. Leaves deciduous, folded along the lateral nerves in vernation, petioled, cuneate to subcordate at base, obovate-oblong to broad-lenticular, .05 to .08 long, acute or acuminate, more or less sinuate-denticulate, the younger silky-ciliate at margin and along nerves of under surface. Involucre light-tawny, .015 long in fruit, silky-woolly, scales erect; nut winged — Spring — Woods; middle zones of Amanus, and northward.

Order CI. SALICINEÆ, Rich. (Willow Family).

Diœcious trees or shrubs, with both kinds of flowers in catkins, one flower under each bract, entirely destitute of calyx and corolla; the fruit a 1-*celled*, 2-*valved pod, containing numerous seeds clothed with long, silky down — Staminate flowers.* Stamens 2-many, free or monadelphous. *Pistillate flowers.* Ovary free, placentæ 2, parietal. Style 1 or more. Stigmas 2 — Leaves alternate, undivided, with scale-like deciduous, or leaf-like persistent, stipules. Wood light colored, soft. Bark bitter.

1. SALIX. Shrubs or trees, usually with oblong, lanceolate, or linear leaves (rarely obovate). Buds not covered with resinous varnish.

2. POPULUS. Tall trees, usually with oblong to ovate leaves (those of early and sterile branches often lanceolate to linear). Buds covered with a resinous varnish.

1. SALIX, Tourn. Willow. Osier. *Ṣaf.ṣâf.*

Scales of catkins entire. *Staminate flowers.* Stamens 2, rarely 3-12, free or somewhat connate, with 1-2 little glands at base. *Pistil-*

late flowers with a small gland at base of ovary on the inner side. Style 0, or more or less elongated; stigmas 2, generally bifid — Trees or shrubs, generally growing beside water, with flexible branches, and undivided, alternate leaves, entire or glandular-toothed. Catkins appearing before or with the leaves.

FIG. 336.



(*a*) Part of a branch of Salix alba, with a catkin of sterile flowers. (*b*) A single sterile flower, consisting of a scale, two stamens, and a gland. (*c*) Part of branch with a catkin of fertile flowers. (*d*) A single fertile flower, consisting of a scale, the ovary with one style and two stigmas, and at the base of the ovary a gland.

* *Catkins lateral, appearing with leaves. Scales pale. Glands* 2. *Capsule glabrous.*

† *Scales deciduous before the maturity of the capsule.*

‡ *Stamens* 5-10.

1 S. Safsaf.

‡ ‡ *Stamens* 2 *or rarely* 3.

2 S. fragilis, 3 alba, 4 Babylonica.

† † *Scales persistent. Stamens* 2-3.

5 S. triandra.

* * *Catkins lateral, appearing before or with leaves. Scales of a different color toward tip, persistent. Gland* 1. *Stamens* 2, *filaments free.*

† *Style very short.*

6 S. Capræa, 7 pedicellata.

† † *Style elongated.*

8 S. nigricans.

1. S. Safsaf, Forsk. ℥ *Safṣâf.* Shrub or tree, with reddish brown branches. Catkins straight, on leafy peduncles, cylindrical, .02

to .03 long; scales pale, deciduous, of one color, round-ovate to oblong, villous; stamens eight or less, filaments villous at base; capsules nearly globular, crowded, glabrous, borne on pedicels at length four times as long as the urn-shaped gland; style and stigmas short. Leaves at length coriaceous, oblong-elliptical to lanceolate, .01 to .1 long, .004 to .01 broad, serrulate to entire, glabrous on both sides, paler at lower surface; stipules on young twigs half-heart-shaped — Early spring — Banks of Jordan, and valleys east of Dead Sea, and northward to Egypt.

2. S. fragilis, L. ♄ Brittle Willow. Branches spreading, *brittle at insertion.* Catkins on leafy peduncles, spreading or recurved; scales pallid, deciduous, clothed with long hairs, especially at base: filaments *slightly hairy at base;* capsules glabrous, elongated-conical, *acuminate*, with pedicel 2-3 times as long as nectarium; style *medium;* stigmas 2-parted, *divaricate.* Leaves lanceolate, when young somewhat hairy, *when adult glabrous*, serratulate; stipules semicordate — April to June — Common.

3. S. alba, L. ♄ White Willow. *Ṣafṣâf.* Branches stiff, *not brittle at insertion.* Catkins on leafy-peduncles, flexuous, spreading; scales yellow, glabrous at apex, deciduous; filaments villous at base; capsules glabrous, ovate-conical, *obtuse*, with pedicel as long as short nectarium; style *almost none;* stigmas *thickened*, *retuse.* Leaves lanceolate, glandular-serrulate, more or less appressed-silky on both sides; stipules *lanceolate,* deciduous — April to June — Common throughout.

Var. **latifolia,** Post. Leaves elliptico-lanceolate to obovate-elliptical, more strongly serrate than in type — Beirût; N.W. of Dead Sea.

Var. **integrifolia,** Post. Leaves entire — Aintâb.

4. S. Babylonica, L. ♄ Weeping Willow. *Es-Ṣafṣâf-el-mustaḥi.* Branches *long*, *slender*, *recurved-drooping.* Catkins short-peduncled, somewhat overtopped by the leaves of the peduncle, .02 to .03 long; scales lanceolate, straw-colored, caducous; capsules *sessile*, ovate-conical, glabrous, pale green; style nearly 0; stigmas divaricating, thickened, entire. Leaves narrow-lanceolate, long-acuminate, serratulate, glabrous at both surfaces; stipules shorter than petiole, awl-shaped — April — Cultivated and escaped from cultivation.

5. S. triandra, L. ♄ Branches slender, brown. Catkins elongated, slender, spreading, on leafy peduncles; scales yellow, obovate to oblong, somewhat persistent, hairy throughout or glabrescent at tip; capsules ovate-conical, obtuse, glabrous; style very short; stigmas short, recurved. Leaves glabrous, oblong to lanceolate, serrulate; stipules semi-cordate — April — Achzîb (Palestine).

6. S. Capræa, L. ♄ ♄ Branches spreading. Catkins *sessile or nearly so*, with minute bracts at base; scales oblong, somewhat acute, *villous*, black at apex; capsules ovate at base, elongated-lanceolate, woolly, borne on pedicels 4-6 times as long as nectarium; style *nearly none;* stigmas bifid, connivent. Leaves ovate to elliptical, oblanceolate, or obovate, abruptly short-acuminate, obsoletely *wavy-crenate*, upper surface glabrous, lower woolly; stipules reniform; buds glabrous — Spring — Lebanon.

7. S. pedicellata, Desf. ♄ Young branches pubescent. Catkins *short-peduncled*, the fertile ones elongated, loose; scales oblong, obtuse, hairy; capsules *glabrous* or appressed-hirsute, long-lanceolate from an ovate-conical base, borne on pedicels 4-6 times as long as nectarium; *style short;* stigmas bifid. Leaves oblong-lanceolate to obovate, nearly entire, reticulate at under surface, which is woolly, or only hirsute at nerves. Stipules semi-orbiculate — March — 'Abeih; Djurd Berkasha.

8. S. nigricans, Fries. ♄ Blackish Willow. *Bân.* Branches divergent, twigs canescent. Catkins sessile, the fertile ones short-peduncled, in fruit loose; scales *acute*, hairy, blackish at apex; capsules ovate at base, awl-shaped, woolly or glabrous, borne on pedicels 3-7 times as long as nectarium, *style long;* stigmas bifid. Leaves ovate to obovate, rarely lanceolate, wavy-toothed, the younger ones pubescent, the older ones glabrous at upper surface, and greyish-glaucescent, hairy, or glabrescent at lower; stipules semi-cordate — March and April — Amanus; Beirût.

2. POPULUS, Tourn. Poplar. Aspen. *Haur.*

Scales of catkins crenate or cut. Perigonium a cup-shaped, obliquely truncate disk. *Staminate flowers.* Stamens 8-30, free, enclosed in perigonium; filaments distinct; anthers 2-celled. *Pistillate flowers.* Ovary sessile or pedicelled, surrounded by perigonium, 1-celled, ∞-ovuled. Style short. Stigmas 2, forked or fringed. Capsule 1-celled, 2-valved, ∞-seeded; seeds minute, implanted on dorsum of valves, erect. Albumen 0 — Trees, usually tall, with scaly buds covered with a resinous varnish, usually ovate to oblong leaves, and catkins appearing before leaves.

* *Young buds pubescent. Twigs woolly or hairy. Scales ciliate. Perigonium obliquely truncate, entire. Stamens* 4-8.

1. P. alba, L. ♄ Abele or White Poplar. *Haur.* 10 to 20; branches spreading, the younger white-woolly. Leaves green at upper surface, snowy-woolly at lower, those of lateral branches ovate to ovate-oblong, sinuate-dentate to -lobed, of the terminal branches *round-heart-shaped to ovate*, angled-dentate to lobed. Scales of fertile flowers lanceolate, crenate and ciliate at tip — Spring — Wet places; common.

* * *Buds pubescent. Twigs puberulent. Scales fringed, sparingly ciliate. Perigonium urn-shaped, many-toothed. Stamens* 25-30.

2. P. Euphratica, Oliv. ♄ Euphrates Poplar. 10 to 15; branches spreading, the twigs puberulent. Leaves glabrous, glaucous, *those of the young plant and of the sterile lower branches linear to lanceolate, entire*, those of fertile branches cuneate to truncate at base, elliptical to oblong-ovate, ovate, *rhomboid*, *deltoid*, round-ovate, and *transversely ovate*, entire, or more or less irregularly dentate; capsules oblong, .01 long — Spring — Banks of streams; Jordan Valley, and elsewhere throughout. Perhaps the *Mulberry* (A.V.) 2 Sam., v. 23.

* * * *Buds and twigs glabrous, viscid. Scales glabrous. Perigonium entire. Stamens* 12-30.

3. P. nigra, L. ♄ Black Poplar. 10 to 20; *branches spreading.* Leaves glabrous, glossy, of the same color on both sides, *deltoid* to *triangular-rhomboid, broader than long, minutely serrulate* — Spring — Cœlesyria; near Damascus.

4. P. pyramidalis, Roz. ♄ Lombardy Poplar. 10 to 20; *branches erect, forming a narrow-conical comus.* Leaves glabrous, glossy, of the same color on both sides, rhombic, *as long as broad,* truncate at base, serrulate — Spring — Cœlesyria and Antilebanon valleys. Probably introduced. Probably a form of the last, as the Cemetery Cypress is of Cupressus sempervirens.

ORDER CII. **CERATOPHYLLEÆ,** Gray. (HORNWORT FAMILY).

Aquatic herbs, with whorled, finely dissected leaves, and minute, axillary, sessile, monœcious flowers, without any floral envelopes, except an 8-12-*cleft involucre or perigonium, the pistillate a simple,* 1-*celled ovary, with a suspended, orthotropous ovule, the seed filled with an embryo with* 4 *cotyledons and a conspicuous plumule* — *Staminate flowers.* Divisions of involucre linear, 2-3-dentate at tip. Stamens 12-15, anthers subsessile, oblong - obovate, notched at tip, 2-celled, the cells half-divided by an incomplete septum. *Pistillate flowers.* Divisions of perigonium linear, entire. Ovary ovate; style straight; stigma subulate. Nutlet coriaceous, beaked with the style, and often prickly at base. Albumen 0.

CERATOPHYLLUM, L. HORNWORT.

Aquatics as above, much branched, somewhat rigid, the stems and branches nodular-jointed, the leaves sessile, 2-3-forked into capillary, entire, dentate, or incised lobes.

C. demersum, L. ♃ As above — Jordan Valley. Seldom seen in fruit.

Var. **commune,** Gray. Fruit wingless, with a short spine or tubercle at the base on each side.

Var. **echinatum,** Gray. Fruit .006 long, rough-pimpled on the sides, narrow-winged, the wing spiny-toothed.

SUBCLASS II. GYMNOSPERMÆ.

DI-POLYCOTYLEDONS.

Pistil represented by an open scale or leaf, or 0; the ovule or seeds therefore naked (without a pericarp), and fertilized by the direct application of the pollen. Represented with us by two orders, Gnetaceæ with two cotyledons, and Coniferæ with two to twelve.

ORDER CIII. **GNETACEÆ,** Blum. (GNETUM FAMILY).

Shrubs or trees, with amentaceous, monœcious or diœcious flowers, subtended by sheaths or bracts. Staminate flowers; involucel bifid, enclosing 1 stamen or several with filaments connate in a column, with 2-4-celled anthers opening by a pore at apex. Pistillate flowers: ovary solitary or twin, surrounded by a double or triple involucre, the outer with a narrow open mouth, the inner exserted in a tubule. Outer coating of seed leathery or fleshy. Embryo in axis of fleshy albumen, antitropous, with 2 cotyledons.

EPHEDRA, L. EPHEDRA.

Flowers usually diœcious. Staminate aments ovate, bracts imbricated in 4 rows. Involucre of pistillate flowers of 2-3, fleshy, bifid sheaths, or 4-5, membranous, imbricated scales — Shrubs, often climbing, leafless, or with small, opposite, linear leaves, the nodes with short sheaths.

* *Nutlets surrounded by a fleshy involucre, forming a false drupe.*

† *Leafless. Sheaths of involucre glabrous.*

1. E. campylopoda, C. A. Mey. ♄ Asperulous, climbing; branches long, distorted; twigs whorled, often retrorse. *Staminate aments* sessile, clustered, with 5-6 anthers, sessile on a long exserted column; *pistillate aments* 3-6 in a cluster, 2-flowered on a reflexed or *recurved peduncle as long as or longer than flowers;* sheaths 2-3, the lower short, truncate, the upper *long, enclosing the nutlets;* tubule short, straight — Late summer and autumn — Hedges; common, even east of Jordan.

† † *Leafy, especially young branches. Sheaths of involucre ciliate.*

2. E. Alte. C.A.M. ♄ *Alte.* Asperulous, climbing; branches long, tortuous; twigs whorled. *Leaves short-linear, opposite. Staminate aments* sessile or short-peduncled, few-flowered, crowded at ends and nodes of branches, with 3-4 anthers sessile on a long-exserted column; *pistillate aments* 1-3 in a cluster, *short-pedicelled,* 1-2-flowered; sheaths 3; the lower cup-shaped, the upper *shorter than nutlet;* tubule straight — Spring — Syrian Desert, Moab, Jericho, Jaffa, and southward.

* * *Sheaths of fruiting involucre membranous, not fleshy. Leafless.*

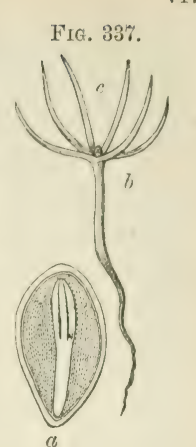
3. E. alata, Dec. ♄ *'Adâm.* Scabrous or puberulent, *not climbing,* rigid, pale. Aments sessile, crowded at ends and nodes of branches; the *staminate,* with 3-5, *stipitate* anthers on a *somewhat exserted* column; the *pistillate* 2-flowered, lutescent in fruit; leaves of involucre 4-5, *loosely imbricated,* and *nearly equal in length,* as long as ovate, acuminate, 3-angled nutlets — Spring — Et-Tîh, and southward.

ORDER CIV. **CONIFERÆ,** Juss. (PINE FAMILY).

Trees or shrubs, with resinous juice, awl-shaped, needle-shaped, or scaly, entire leaves, monœcious (rarely diœcious) flowers usually in catkins or strobiles, the flowers destitute of

calyx and corolla — *Staminate flowers.* Anthers adnate at base of bracts, usually sessile or arranged along the axis of the bractless catkin. *Pistillate flowers.* Ovules 2, rarely numerous, orthotropous, situated at base of inner surface of the scales of the strobile, or solitary or twin in a fleshy involucre with an open mouth. Seeds naked, albuminous, erect or inverted, the embryo in the axis, straight, antitropous, cotyledons usually numerous, whorled.

FIG. 337.



(*a*) Seed of a conifer, showing the axial, straight embryo, surmounted by its cotyledons. (*b*) The stem in germination. (*c*) The six cotyledons with the plumule in their midst.

TRIBE I. **CUPRESSINEÆ**, (CYPRESS TRIBE) *Staminate catkins* composed of opposite or ternately whorled scales. Anthers 3-5, rarely two, nearly globular. *Pistillate strobile* globular, composed of 4-14, opposite or ternately whorled scales, free or connate at base, peltate, and in fruit coriaceous or fleshy, and coalesced. Leaves opposite.

1. CUPRESSUS. Monœcious. Strobile of 8-14, woody, peltate scales.

2. JUNIPERUS. Diœcious or monœcious on separate branches. Strobile of 4-6, fleshy-scales, forming a sort of berry.

TRIBE II. **TAXINEÆ.** (YEW TRIBE.) Diœcious. *Staminate catkins* composed of shield-shaped scales. Anthers 2-8, pendulous, 1-celled. *Pistillate catkin* reduced to a fleshy disk, subtended by bracts at base and surrounding the base of the naked seed, and in fruit forming a simple or double cup partially enclosing the seed.

3. TAXUS. Trees with nearly two-ranked, linear, flattened leaves.

TRIBE III. **ABIETINEÆ.** (HEMLOCK FAMILY.) Monœcious. *Staminate catkins* terminal and axillary. Bracts numerous, spirally arranged around axis. Stamens 2 under each bract, filaments short, anthers 2-celled, the connective ending in an awn or tubercle. *Pistillate catkins* consisting of open, imbricated scales in the axil of a bract, the ovules 2 under each scale, and adnate to its base, these catkins at maturity forming *a cone*, the leathery or woody scales of which are persistent or caducous. Seeds winged or wingless, pendulous — Trees with linear or needle-shaped, flat, flattened-triquetrous, semiterete, or tetragonal leaves.

* *Cones maturing the second or third year.*

4. PINUS. Leaves 2-several, needle-like, sheathed at base by scarious scales.

5. CEDRUS. Leaves 30-40, whorled at tip of twigs.

* * *Cones maturing in one year.*

6. ABIES. Leaves scattered along the branches, linear, flat, obtuse.

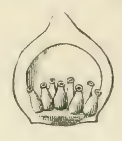
1. CUPRESSUS, Tourn. CYPRESS. *Sarū.*

Flowers monœcious on different branches. *Staminate catkins* oblong to oblong-cylindrical, the scales decussate, in 4 rows, nearly peltate, bearing 2-4, sessile anther-cells under the lower margin. *Pistillate catkin* globular, composed of 8-14, at length woody, peltate scales, mucronate at back, free, the upper sterile. *Galbules* maturing

the second year, scales angular-orbicular, umbonate, touching at border, at length dehiscent. Nutlets under each scale numerous, in several rows, ovoid to oblong, bony, often winged — Evergreen trees, with a strong scent, and scale-like, appressed-imbricated leaves, and very durable wood.

C. sempervirens, L. Cypress. *Saru. Sherbîn.* ♄ 5 to 25; comus conical-pyramidal or loosely ovoid, the branches more or less spreading, the twigs nearly in two rows, somewhat tetragonal. Leaves *scale-like*, opposite, in 4 rows, ovate, obtuse, convex and grooved at back. *Staminate catkins* oblong-cylindrical; *pistillate* globular, at length horizontal; galbules globular, .02 to .03 in diameter, leaden-grey — Spring — Middle mountain zones.

Fig. 338.



Scales of C. sempervirens, with numerous naked ovules at its base.

The compact variety, with a cylindrico-conical comus, is everywhere cultivated under the name of *Saru* in the cemeteries, especially by the Muslims.

2. JUNIPERUS, L. Juniper.

Flowers diœcious or monœcious on separate branches. *Staminate catkins* globular or ovate, scales decussate or ternate, loosely imbricated, nearly orbicular, bearing 3-6, globular anther-cells on their lower surface. *Pistillate catkins* subtended by a few, appressed, sterile bracts, and composed of 4-8, decussate or ternately whorled, fleshy, coalescent scales, each bearing a single, gourd-shaped, erect ovule. Galbules fleshy, indehiscent, ribbed by the prominent margins of the scales, and furnished at tip with a depressed, triangular areola. Seeds 1-3, rarely 4-8, erect, angled, wingless, separate or rarely coalesced, bony.

* *Twigs triquetrous. Leaves ternately whorled, jointed at base, needle-like, prickly.*

1. J. drupacea, Labill. ♄ *Difrân.* 5 to 10; comus pyramidal, twigs spreading. Leaves rigid, spreading or reflexed, oblong to linear-lanceolate, .01 to .015 long, channeled at upper surface, keeled at lower. *Staminate catkins* usually solitary in axils, nearly sessile, ovate, .003 long. *Galbules* globular, .02 to .03 in diameter, reddish with a *purple* bloom; scales 7-8, in 3 rows, *margin prominent;* seeds connate into a woody, 3-celled sort of capsule — August — Middle to subalpine Lebanon, Hermon, Cassius, Amanus, Akher Dagh, and northward.

2. J. macrocarpa, S. et S. ♄ ♄ Branches spreading. Leaves ternate, spreading, linear-lanceolate, .01 to .02 long, bisulcate at upper surface, keeled at lower. *Staminate catkins* sessile in upper axils, solitary. *Galbules* globular, .01 to .015 in diameter, reddish to *blackish-brown*, with a *bluish* bloom, rarely elliptical; scales 3, rarely 6, in 3 rows, imbricated, margins free at tip; seeds 3 or less — Autumn — Syrian coast; lower zone of Lebanon.

Differs from next by more slender branches, usually longer leaves, blackish-brown galbules nearly twice as large, scattered, not crowded.

3. J. Oxycedrus, L. ♄ *'Ar'ar.* 5 to 6, but more often a hemispherical or prostrate shrub. Leaves ternately whorled, approximated, spreading, linear-lanceolate, .01 to .015 long, obsoletely bisulcate at upper surface, keeled at lower. *Staminate catkins* ovate, solitary, nearly sessile. Galbules globular, .006 to .008 in diameter, *red, at length glossy;* scales 3 or 6, with margins *scarcely prominent;* seeds 2-3, rarely 1 — Spring — Lower and middle to subalpine zones of mountains throughout.

* * *Twigs teretish or tetragonal, covered with the imbricated leaves. Leaves ternately whorled or decussate in 4 rows, small, scale-like, not jointed, almost entirely adnate to branches, free at tip, usually with a resinous gland at back.*

† *Galbules maturing in one year*

4. J. excelsa, M. B. ♄ *Lizzâb* (*Turc. Ardîtch*). 5 to 20; comus pyramidal, twigs erect or spreading. Leaves of branches ternate, *ovate-triangular*, acute, of twigs in 4 rows, imbricated, appressed, rhombic-ovate, acutish, *with an oblong gland at back. Staminate catkins* erect or somewhat nodding, ovate, obtuse. *Galbules* crowded on a short, *somewhat incurved* twig, globular, .008 in diameter, blackish with a white bloom; scales about 4, their tips at length almost obliterated: seeds 6-4 — Spring — Subalpine and alpine regions to 2700 m.

5. J. fœtidissima, Willd. ♄ 5 to 15; branches erect. Leaves of branches and primary twigs in 4 rows, decussate, *ovate to lanceolate-acuminate, free except at base,* of terminal twigs ovate-rhombic, acutish, *glandless at back. Staminate catkins* erect, ovate-globular, with rounded scales. *Galbules* solitary, on a short, *erect* twig, globular, .01 in diameter, *tawny purple to blackish, glaucescent;* scales 4-6, with slightly prominent margins; seed 2-1 — Spring — Middle zone of Amanus, near Hodhu.

† † *Galbules maturing in two years.*

6. J. Phœnicea, L. ♄ ♄ Shrub or tree, with erect or ascending, terete branches. Leaves minute, ternately whorled or opposite, appressed, imbricated, ovate-rhombic, *obtuse*, with a convex back marked by a linear gland. *Staminate catkins* erect, on short twigs, ovate-oblong, with rounded scales. *Galbules* nearly sessile, rather large, globular, *tawny-red*, glossy, at length fleshy; scales 6-8, with indistinct margins; seeds 3-6 -- Spring -- Wadi-el-'Arabah, and on its flanks to summit of Mount Hor.

3. TAXUS, L. Yew.

Flowers diœcious, axillary. *Staminate catkins* small, nearly globular, subtended by imbricated bracts at base; scales few, peltate, with 5-8 anthers at under surface. *Pistillate catkins* composed of small imbricated bracts, at base of ring-shaped, at length urn-shaped receptacle, which forms a sort of drupe-like fruit, subtended by the cupule of bracts, the tip of the naked seed visible in the open mouth of the receptacle — Trees, with alternate leaves in 2 rows.

T. baccata, L. ♄ Yew. Ground Hemlock. 3 to 6. Leaves subpetioled, flat, linear, .02 to .035 long, obtuse, dark green at upper surface, glaucescent at lower. *Staminate aments* pendulous; scales

about 7-lobed. *Fruits* somewhat peduncled, spreading; cupule hemispherical, as long as or longer than the ovate seed — Spring — Gesbel-Dagh (Amanus).

4. PINUS, Tourn. PINE. *Snaubar.*

Staminate cakins oblong to cylindrical, with a scaly involucre at base, crowded at base of twigs. Cells of anthers dehiscent lengthwise. *Pistillate catkins* nearly terminal or lateral. *Cones* rarely maturing before the second year, often not before the third. Scales persistent, leathery or woody, ending in a shield-shaped tip, with a dorsal or terminal boss — Trees, with clustered, needle-like leaves, sheathed by scarious scales at base. The resinous canals of the leaves are longitudinal, and either next to the epidermis (*peripheral*), or in the substance of the leaf (*parenchymatous*), or near the ventral vessels (*internal*).

* *Cones nearly terminal. Leaves twin, serrulate.*

1. P. Pinea, L. ♄ 10 to 20; comus hemispherical, lower branches horizontal. Leaves .10 to .12 or more long, stiff, ascending. *Staminate catkins* oblong, .008 long, *crowded in an oblong spike*, .05 to .07 long, .015 to .02 in diameter. *Cones* solitary or twin, nearly sessile, horizontal or somewhat reflexed, .1 to .15 long, .08 to .1 in diameter, *ovate*, obtuse, *maturing the third year;* end of scales rhomboid, *flattened-pyramidal*, glossy; boss depressed, small; seeds obovate, angled, .015 long, *almost wingless*, with *bony shell* — Spring — Sands and rocky places; extensively cultivated, and usually pruned to an umbrella-like top on a naked trunk.

* * *Cones lateral. Leaves twin, scabrous-margined or entire.*

2. P. Halepensis, Mill. ♄ 3 to 10; comus diffuse; branches somewhat whorled, ascending. Leaves twin, slender, .1 to .15 long. *Staminate catkins* short-cylindrical, *clustered-capitate*. *Cones* solitary or 2-3 in a whorl, reflexed on thick peduncles, *oblong-conical*, .08 to .1 long, .05 to .06 in diameter, maturing the second year; end of scales flattish, *transversely slightly keeled;* boss small, flattish; seeds oblong, .006 long, .003 broad, with a *thin shell*, and a wing 3-5 times as long as they — Spring — Lower and middle mountain zones throughout, except in deserts.

3. P. Brutia, Ten. ♄ 3 to 10; comus diffuse; branches somewhat whorled. Leaves twin, long, thickish. *Staminate catkins* clustered-capitate. *Cones* 3-6, whorled, ascending, oblong-conical, .08 to .1 long, .05 to .06 in diameter, maturing the second year; ends of scales more or less *prominently* transversely keeled; boss not prominent; seeds small, *many times* shorter than wing — Spring — Lower and middle mountain zones of Lebanon; Akher Dagh. Probably a variety of the last.

5. CEDRUS, Link. CEDAR. *Arz.*

Monœcious. *Staminate catkins* cylindrical-conical, terminal, solitary, erect on upper surface of branches. *Pistillate catkins* ovoid, quite obtuse, solitary or twin, at extremity of twigs. *Cones* maturing in the second year, erect. Scales persistent, coriaceous, woody, flat, with

thin margins, broader than long, very closely imbricated. Seeds winged. Cotyledons about 12 — Tall trees, flowering in autumn, the leaves 30-40, whorled at tip of twigs, persistent, short-needle-like.

C. Libani, Barr. ♄ Cedar of Lebanon. *Arz Lubnân. Arz-ur-Rubb. Ibhul. Tnûb.* 10 to 25; comus broad-conical, or sometimes umbrella-like; branches horizontal. Leaves needle-like, .02 to .03 long, somewhat tetragonal, stiff, acute. *Staminate catkins* .02 to .03 long, .008 to .01 in diameter; scales tawny, eroded at tip. *Pistillate catkins* obovate-oblong, scales brownish purple, soft-silky; *cones* oblong to oblong-ovate, .1 to .15 long, .08 to .1 in diameter, often with a digital depression at obtuse apex; bracts much smaller than scales; seeds obovate, .01 long, .006 broad at tip, one-third as long as somewhat quadrate wing — Autumn — Subalpine Lebanon, Amanus, and Akher Dagh. There are groves of Cedars above el Ma'âṣir, Barûk, 'Ain-Zehaltah, Hadeth, Besherri, and Sîr. Also in Amanus from Hodhu northward. I found a solitary tree at base of Kai-Pok-Dagh.

6. ABIES, Link. Spruce. Fir. *Shûḥ.*

Monœcious. *Staminate catkins* ovate to cylindrical, arising from axils of previous year's leaves. Connective of anthers ending in a tubercle, the cells splitting transversely. *Pistillate catkins* lateral or terminal, on branches of preceding year, erect. *Cones* maturing in one year, scales thin, deciduous. Seeds winged, thickly beset with resinous vesicles — Trees, flowering in spring; leaves persistent, nearly sessile, more or less flattened, and by a twist at their base forming two rows, along the horizontal twigs, attached by a circular base.

A. Cilicica, Ant. et Ky. ♄ Cilician Spruce. *Shuḥ.* (Turc. Illeden). 10 to 25, comus oblong-conical: branches approximated, the lower horizontal, the upper nearly erect; the twigs in 2 rows, opposite. Leaves linear, .02 to .03 long, flat, obtuse, retuse, pale green at upper surface, cartilaginous-margined and keeled at lower, with a groove on each side of the midrib, marked by longitudinal lines of minute white dots. *Staminate catkins* at axils, crowded at lower surface of twigs, oblong, .01 long, .003 thick. *Pistillate catkins* solitary on upper branches, erect; *cones* cylindrical, .2 long, .05 thick, greenish purple, obtuse; scales abruptly clawed, much broader than long, tomentellous at margin, and ending at each side in a recurved hook; bract stipitate, spathulate, retuse, mucronulate, included; seed obovate-oblong, .01 long, half to one-third as long as obovate wing — Spring — Subalpine and alpine Lebanon, Amanus, and northward.

Class II. **ENDOGENS or MONOCOTYLEDONS.**

Stems with no manifest distinction into bark, wood, and pith; the woody fibres and vessels in bundles or threads, which are irregularly imbedded in the cellular tissue; perennial trunks destitute of annual layers. Leaves mostly parallel-veined (nerved) sheathing at base, seldom jointed at base where they join the stem, usually alternate or scattered, entire. Parts of flower usually in threes. Embryo with a single cotyledon, and leaves of plumule alternate.

Fig. 339.

(a b c) Seed of a monocotyledon in germination, showing (a) cotyledons, (b) seed coat, (c) radicle. (a· b· c·) The same in a more advanced state, showing (a·) two stem-leaves emerging from the cotyledon, (b·) and (c·) the roots developed from the primitive radicle. (d) Longitudinal and transverse section of a stalk of maize, showing the arrangement of the fibres and vessels. (e) Similar sections of the trunk of a kind of palm. (f) Cross section of an exogen, for comparison.

Order CV. **HYDROCHARITACEÆ,** L. C. Rich.

(Frog's Bit Family).

Aquatic herbs, with diœcious or polygamous, regular flowers on scape-like peduncles from a spathe, and simple or double floral envelopes, which in the fertile flowers are united

into a tube, and coherent with the 1-6-*celled ovary* — Perigonium (perianth) of 2-6 lobes, the staminate destitute of tube. Stamens 3-12, anthers with 2 sheaths, and 2-4 cells. Ovary usually with many-ovules, attached toparietal placentæ, anatropous or orthotropous. Stigmas 2-6. Fruit submerged, crowned with the limb of the perigonium, with 1 cell, or several (false) cells, berry-like or membranous, indehiscent or rarely stellately dehiscent. Seeds indefinite; albumen 0; testa membranous; embryo usually straight.

HALOPHILA, Thouars. HALOPHILA.

Staminate flowers. Perianth simple, 3-leaved. Stamens 3, alternating with leaves of perianth. Anthers sessile, extrorse, 4-celled. *Pistillate flowers.* Perianth minute, 3-2- (sometimes 4-5-) lobed. Ovary gourd-shaped, with 2-5, usually 3 placentæ, parietal, the ovules usually numerous, anatropous, ascending. Stigmas 2-5 (more often 3), inserted between the leaves of the perianth, much longer than they, filiform, grooved at inner face. Fruit membranous. Seeds usually numerous, nearly globular, the testa easily separating. Embryo thick, hollowed at tip, to receive the cotyledon from the sheath-like cavity of which projects the plumule — Marine, submerged, perennial herbs. Leaves approximated in pairs, frond-like, the blade 3-nerved. Flowers sheathed by a 2-leaved spathe, at the end of short branches, the staminate peduncled, the pistillate sessile.

H. stipulacea, Forsk. ♃ Blade of twin leaves oblong-elliptical to elliptical-lanceolate, .03 to .05 long, .005 to .008 broad, tapering to a usually short petiole, which is sheathed at base by a scarious scale — June — Red Sea along Sinaitic peninsula.

ORDER CVI. **ORCHIDEÆ.** (ORCHIS FAMILY).

Perennial herbs with alternate leaves, generally tuberous roots, and perfect, irregular, often showy flowers, the 6-*merous perianth adnate to the* 1-*celled ovary. Placentæ* 3, *parietal; ovules very numerous. Stamens* 3, *gynandrous, of which one or two are sterile; the pollen cohering in masses. Fertilization by insects* — Perianth in two sets; the outer 3 (*sepals*) and upper two of the inner (petals) forming *the labium or hood*, and the lower (originally upper, but becoming lower by a twist in the ovary or its stalk) large, often spurred, forming the *labellum.* Before the lip, in the axis of the lower, is the *column* (*gynostemium*), composed of the style or thick fleshy stigma, bearing a central fertile and two lateral sterile stamens (the latter *staminoids*), or rarely a central sterile, and two lateral fertile ones. Anthers 2- (rarely 1-4-) celled, each cell containing one or more pollen-masses, often caudiculate (*pollinia*) adherent to stigmatic glands. Style prolonged into an indistinct, fleshy process

(*beak*), between the cells of the anther; stigma a glutinous disk excavated in the face of the column, often furnished at one or both sides with a single or double gland (*proscolla*), naked or enclosed in a fold (*pouch*) of the stigma. Capsule dehiscent by 3, longitudinal chinks. Seeds minute, sawdust-like. Albumen 0.

* *Anther* 1, *connate with column only at base, persistent marcescent. Pollinia not caudiculate, granular or powdery.*

† *Stigmatic glands* 0. *Labellum somewhat jointed, more or less saccate.*

1. CEPHALANTHERA. Tall, leafy herbs, with loose spikes of yellowish or white flowers, .02 to .03 long.

† † *Stigmatic glands existing, the pollinia adhering to them.*

2. LIMODORUM. Parasitic, leafless herbs, with livid flowers, .04 long.
3. EPIPACTIS. Tall, leafy herbs, with greenish-purple flowers, .015 to .02 long.

* * *Anther* 1, *persistent, adnate to the whole column. Pollinia* 2, *caudiculate, consisting of shapeless, waxy masses, united by a web-like, elastic axis, inserted on the caudicle of the stigmatic gland.*

† *Glands double.*

‡ *Pouch one.*

4. TINÆA. Labellum short-spurred. Lateral sepals gibbous at base.
5. ORCHIS. Labellum long-spurred at lower and posterior aspect. Lateral sepals not saccate at base.

‡ ‡ *Pouches two.*

6. OPHRYS. Labellum not spurred, usually gibbous at base.

‡ ‡ ‡ *Pouch none.*

7. GYMNADENIA. Labellum with a spur (in ours) twice as long as ovary.

† † *Gland single.*

8. SERAPIAS. Flowers maroon-colored. Labellum deflexed, spurless, unequally 3-lobed, lateral lobes rounded, terminal ovate.
9. ACERAS. Flowers large, lurid. Labellum with falcate lateral, and strap-shaped, elongated, terminal lobe.
10. ANACAMPTIS. Flowers small, pink. Labellum equally 3-lobed, long-spurred.

1. CEPHALANTHERA, Rich. CEPHALANTHERA.

Leaves of perigonium distinct, somewhat connivent, overlapping labellum. Labellum constricted at middle, somewhat jointed, the lower division (*hypochilium*) somewhat sacculate, rarely spurred, 2-lobed, parallel with column and connate with its base, upper joint (*epichilium* or *lamina*) somewhat reflexed at tip. Column elongated, erect. Anthers oblong, movable, affixed at back, cells distinct. Pollinia two, cylindrical, 2-lobed. Beak and proscolla 0. Ovary twisted — Perennial herbs, growing from a rootstock.

1. C. ensifolia, Murr. ♃ .4 to .8; root-stock horizontal, with long fibres; stem grooved, stiff, densely leafy. Leaves in two rows, ascending and spreading, lanceolate to linear, .08 to .2 long, acute. Spike loose, many-flowered, glabrous; bracts ovate-lanceolate to ovate, acute, *minute, much shorter than ovary;* flowers with ovary .02 long, *white*, the labellum with yellow spot at tip; ovary glabrous; sepals lanceolate, acute; petals elliptical; labellum shorter than sepals, not

spurred, almost orbicular, somewhat crested at the veins, constricted about middle, the hypochilium somewhat 3-lobed, the epichilium triangular, broader than long, obtuse, mucronulate — Spring — Woods and shady places; Gilead and Moab; subalpine Lebanon: **Aintâb.**

Var. **gibbosa,** Boiss. Labellum manifestly saccate beneath — Baniâs (Nusairy mountains).

2. C. pallens, Willd. ♃ .4 to .8; root-stock short, with numerous fibres; stems grooved, leafy along their whole length. Lower leaves *ovate to ovate-oblong*, .05 to .08 long, acute, upper oblong-lanceolate, .1 long. Spike loose, few-flowered; lower bracts *lanceolate, longer than flowers, upper linear-setaceous*, a little shorter than ovary; flowers with ovary .03 long, *cream-colored*, the labellum yellow within; ovary glabrous; sepals and petals oblong, obtuse, .015 to .02 long; labellum shorter than petals, ovate-orbicular, dentate-crested at nerves, constricted about middle, the hypochilium 3-lobed, the epichilium obtusely cordate-triangular, broader than long — Spring — Wadies of Gilead (Tristram).

2. LIMODORUM, Tourn. LIMODORUM.

Sepals and petals ascending. Labellum constricted at middle, somewhat jointed, the hypochilium parallel to column, connate with it at base, spurred; epichilium undivided Column elongated, triangular. Anther oblong, terminal, movable, 2-celled. Pollinia 2, undivided, at length adherent to the transversely ovate, 2-lobed, stigmatic glands. Ovary not twisted, stipitate — Parasitic, leafless herbs, growing on roots of Pines and Oaks.

L. abortivum, L. ♃ .5 to .8; root-stock short, horizontal, bearing numerous, fleshy fibres; stems thick, with numerous sheaths, the lower obtuse, the upper acute or acuminate. Spike .2 long, rather loose; bracts lanceolate, acute, usually longer than ovary; flowers .04 long, *livid*, erect; sepals oblong, rather obtuse or acutish; petals linear-lanceolate; labellum shorter than sepals and petals, lamina *violet*, obovate to oblong, crenulate; spur subulate, as long as ovary — Spring — Woods; Gilead; Kurd Dagh; Aintâb; and northward.

FIG. 340.



Limodorum abortivum. (*aa*) Sepals. (*bb*) Petals. (*c*) Labellum and spur.

3. EPIPACTIS, Hall. EPIPACTIS.

Sepals and petals spreading, nearly equal. Labellum constricted at middle, jointed, the hypochilium at a right-angle with the column, the epichilium broader, with two warts at base. Column short. Anther erect, movable, attached by its base to the tip of the column, 2-celled. Stigma nearly square, with a broad margin. Beak short, obtuse, ending in a gland. Pollinia 2, oblong, bifid, at length attached to gland. Ovary not twisted, tapering to a stalk — Perennial herbs with a root-stock.

1. E. veratrifolia, Boiss. et Hoh. ♃ .5 to 1: root-stock creeping, bearing long, fleshy fibres and stolons; stems leafy. Leaves with many nerves, the lowest reduced to somewhat inflated sheaths, the others *ovate or oblong to lanceolate and linear-lanceolate*, the intermediate often .3 long, .03 broad at broadest part, acuminate, *the uppermost* gradually changing to lanceolate bracts. Spike .2 to .3 long, loose; lower bracts much longer than flowers, upper shorter than ovary; inflorescence pubescent: flowers .015 to .02 long, nodding, purple tinged with green; perigonium somewhat campanulate, lateral sepals half-ovate, incurved, intermediate ovate-oblong, all tapering, petals ovate, shorter than sepals: labellum shorter than petals, the hypochilium concave, incurved, the epichilium *truncate-subcordate at base*, oblong, *suddenly narrowed near its middle, nearly 3-lobed*, the lateral lobes small, obtuse, the intermediate lanceolate, acute — July and August — Moist places: middle to subalpine Lebanon: Galilee: Phœnician coast.

2. E. latifolia, All. ♃ 1 or more; root-stock thick, with fleshy fibres and sessile buds; stem stoutish, terete, leafy, pubescent above. Leaves scabrous-pubescent at margins and nerves, ovate to ovate-oblong, lanceolate, and linear-lanceolate, the intermediate the longest, .05 to .1 long. Spike .3 to .5 long, somewhat one-sided, many-flowered: bracts lanceolate, the lower much longer than flowers: flowers .01 to .015 long, nodding; sepals and petals greenish-violet, ovate, acute, about of equal length; labellum purple, white-margined, the hypochilium concave, with a narrow mouth, the epichilium *ovate, acuminate, with recurved tip, the warts nearly obsolete* — June — Shady places and woods of middle and subalpine zones of Lebanon, Amanus and northward.

4. TINÆA, Bivon. Tinæa.

Sepals connivent in a hood, connate below, free above, the lateral gibbous at base. Labellum spreading, flat, trifid, with a very short spur at base. Column very short. Anthers adnate along their whole length, with nearly parallel cells, separated by a minute beak. Pollinia with very short caudicles. Glands 2, distinct, included in a 2-celled pouch. Ovary linear, scarcely twisted — Herbs, with tuberous roots and dense spikes of small flowers, distinguished from Aceras by the distinct glands, and from Orchis by the very short column and spur, and the lateral petals gibbous at base.

T. intacta, Link. ♃ .2. Leaves ovate-oblong, .05 to .07 long, sometimes spotted, the uppermost with long sheaths, lanceolate. Spike dense, .03 long, sometimes rather one-sided: bracts acute, half as long to nearly as long as ovary; flowers *minute* with ovary less than .01 long; sepals and petals *flesh-colored, with or without dark purple lines*, the former ovate-lanceolate, acute; the latter linear, obtuse, *very narrow;* labellum about as long as sepals, flesh-colored, trifid, the lateral lobes linear, the intermediate broader and somewhat longer, bifid; spur one-fifth as long as ovary, slender-conical — Spring — Middle zone of Lebanon.

5. ORCHIS, L. Orchis. *Sahlab.*

Sepals and petals connivent or spreading. Labellum directed forward, spurred. Column short, erect. Anthers entirely adnate.

cells parallel, with beak between. Pollinia with a viscid gland at base of caudicle. Pouch 2-celled, enclosing glands. Ovary generally twisted — Herbs, (ours) with tuberous roots.

Sect. I. Herorchis. Sepals connivent, forming a hood.

* *Tubers ovate-globular, undivided, not tapering. Bracts membranous.*

† *Bracts about as long as ovary or longer.*

‡ *Labellum entire. Flowers .02 to .03 long.*

1 O. papilionacea.

‡ ‡ *Labellum 3-lobed or -parted.*

2 O. Morio, 3 coriophora, 4 sancta, 5 tridentata, 6 lactea.

† † *Bracts very small, scale-like. Labellum tripartite.*

7 O. Simia, 8 punctulata, 9 longicruris.

* * *Tubers cylindrical, fusiform-tapering, sometimes lobed. Bracts herbaceous.*

10 O. angustifolia.

Sect. II. Androrchis. Sepals spreading or reflexed.

* *Tubers ovate-globular, undivided, not tapering.*

† *Bracts membranous, usually colored, simple-nerved.*

‡ *Labellum undivided.*

11 O. saccata.

‡ ‡ *Labellum more or less 3-lobed.*

12 O. mascula, 13 Anatolica.

† † *Bracts membranous, the lower especially netted-nerved.*

14 O. palustris, 15 laxiflora.

* * *Tubers palmate-lobed or -cleft, the lobes tapering-fusiform. Bracts membranous, the lower especially netted-nerved.*

16 O. incarnata, 17 latifolia, 18 pseudosambucina, 19 maculata.

1. O. papilionacea, L. ♃ Butterfly Orchis. .2 to .3; tubers globular. Leaves oblong to lanceolate. Spike loose, usually few-flowered, ovate to oblong, .04 to .15 long; bracts 3-5-nerved, purplish, longer than ovary; sepals and petals lanceolate-ovate to lanceolate, purple; labellum orbicular to obovate, constricted at base, usually crenate-denticulate, *deep red*, longer than sepals; spur cylindrical-subulate, somewhat shorter than ovary — March to May — Rocky places and hillsides; coast and lower zones of mountains; Zahleh.

2. O. Morio, L. ♃ .25; root-leaves oblong, .05 to .1 long; stem-leaves clasping, sheath-like. Spike loose; bracts oblong, about 3-nerved, purplish, sepals and petals oblong, short, obtuse, light pink with green nerves; lobes of light pink labellum entire or dentate, the middle one retuse; spur ascending, or horizontal, cylindrical, *dilated*

at somewhat bi-gibbous apex, about as long as labellum — February to April — Fields and grassy places: coast and lower to middle zone of mountains.

3. O. coriophora, L. ♃ .3 to .5, leafy to top. Leaves linear-lanceolate, acute, .05 to .12 long, the upper sheathing. Spike dense, .06 to .15 long; bracts linear-lanceolate, 1-nerved; flowers *dusky purple, with pink dots;* sepals united to middle, ovate-lanceolate, much larger than lanceolate petals, hardly longer than labellum; labellum pendulous, trifid for half its length into unequal lobes, the middle one oblong, entire, the lateral rhombic, somewhat crenate: spur conical, somewhat shorter than labellum — Spring.

Fig. 341.



Bract and flower of Orchis coriophora.

Var. **fragrans,** Boiss. *Sweet-scented.* Middle lobe of labellum longer than lateral: spur about as long as labellum — Coast and lower mountain zone of coast range.

4. O. sancta, L. ♃ .3 to .5; tubers ovate-globular, undivided; stem leafy to top. Lower leaves oblanceolate, .08 to .1 long; upper linear-lanceolate, gradually diminishing in size. Spike dense, .1 to .15 long; bracts membranous, 1-nerved, lanceolate; flowers .01 to .03 long, *dusky* purple; sepals lanceolate, acuminate, connate to beyond middle; petals linear-lanceolate, acuminate; labellum *pendulous*, cuneate at base, trifid to half its length, the lateral lobes rhombic, 3-4-serrate, the middle lobe twice as long, oblong, entire or denticulate; spur recurved, one-half to one-third as long as ovary — Spring — Sandy places and hillsides; coast and lower and middle mountain zones.

Fig. 342.



Bract and flower of Orchis sancta.

5. O. tridentata, Scop. ♃ .3; tubers oblong, undivided. Leaves oblong to lanceolate-oblong. *Spike at first nearly globular*, dense, then oblong, .03 to .04 long; bracts purplish lanceolate-subulate; flowers lilac-purple to pink, *more or less variegated with deeper colored spots;* sepals ovate-lanceolate, acuminate, twice as long as linear-lanceolate petals: labellum deflexed, trifid, lateral lobes oblong-oblique, terminal fan-shaped-obcordate, all more or less denticulate; spur cylindrical, deflexed, one-half to two-thirds as long as ovary — Spring — Coast to middle mountain zone, on both sides of Jordan and northward.

Fig. 343.



Bract and flower of Orchis tridentata.

Var. **albiflora,** Post. Spike loose, few-flowered. Flowers *white*, or with a pinkish blush, not variegated. Lobes sparingly denticulate.

6. O. lactea, Poir. ♃ .2 to .5. Leaves oblong to oblong-lanceolate. Spike at first ovate, dense, at length oblong, .04 to .05 long; bracts membranous, linear-lanceolate, acuminate; flower *white* or pale pink, dotted with red; sepals ovate-lanceolate, *long-acuminate*, connate at base; petals linear-lanceolate; labellum pendulous; trifid, the lateral lobes spathulate, truncate, denticulate; the middle one fan-shaped, undivided or notched, more or less denticulate; spur declined, curved, shorter than ovary — Spring -- Hills; coast to middle mountain zone.

Fig. 344.



Orchis lactea. *(aaa)* Sepals. *(bb)* Petals. *(c)* Ovary. *(d)* Labellum. *(e)* Spur.

7. O. Simia, Lam. ♃ .2 to .5. Leaves oblong-elliptical to oblong. Spike ovate, dense, then oblong, .04 to .1 long; bracts scarious, 1-nerved, ovate-oblong; sepals flesh-colored to pink, ovate-lanceolate, green-nerved; petals linear; labellum flesh-colored to deep purple, longer than hood, *lobes linear, obtuse, the middle one deeply bifid, with a tooth at fork, lobes all about of equal length;* spur cylindrical, obtuse, one-third to one-half as long as ovary — Spring — Middle mountain zone; Aintâb to Marash, and northward.

Fig. 345.





Flower of Orchis Simia.

8. O. punctulata, Stev. ♃ .6 to .8. Leaves elliptico-oblong, obtuse, to oblong-lanceolate, acute. Spike oblong to cylindrical, .15 to .2 long; bracts triangular-ovate, scarious; sepals oblong, acutish; petals linear, acute; labellum *yellowish-green*, the lateral lobes *linear-spathulate, curved*, the middle one fan-shaped, 2-lobed, the lobes *rounded*, entire or crenulate, with a tooth at sinus; spur cylindrical, half to one-third as long as ovary — May — Woods 2½ hours west of Es-Salt. Plain of Issus. Tristram and Paine say that O. militaris, L. is found in Gilead. Probably their plant is this species.

Fig. 346.



Orchis punctulata. *(a)* Sepal. *(b)* Petal. *(c)* Labellum and spur.

9. O. longicruris, Link. ♃ .3. Stem stiff, fistulous. Leaves numerous, oblong to lanceolate, *wavy-margined*. Spike ovate, dense, .03 to .08 long, .02 to .05 broad; bracts scarious, ovate-lanceolate, acuminate; sepals and petals distinct, lanceolate, *lilac-veined*, the latter much smaller; labellum pale, elongated, glabrous, with two triangular lamellæ or gibbi at base, tripartite, lobes *acute*, the *lateral linear, somewhat falcate, the terminal*

Fig. 347.



Orchis longicruris. *(aa)* Two sepals. *(bb)* Two petals. *(c)* Labellum. *(d)* A more slender form of labellum.

longer and broader, divaricate into long, linear, spreading or falcate, acute, rarely obtuse *lobules, with a slender, awn-like lobe between;* spur cylindrical, obtuse, bigibbous, one-third to one-half as long as ovary — April — Hills; coast to middle mountain zone.

10. O. angustifolia, M. B. ♃ .3 to .8. Leaves oblong to linear-lanceolate, .1 to .2 long, more or less acute, erect, passing gradually into bracts. Spike loose; bracts 3-nerved, lanceolate, as long as ovary or longer; flowers pink; sepals oblong, petals linear-lanceolate; labellum somewhat longer than hood, wedge-shaped at base, fan-shaped, short-3-lobed, the lateral lobes rounded, sometimes crenulate, the middle one as long as lateral, and as broad or narrower and dentiform; spur slender, incurved, acute, half as long as ovary — June to September — Marshy places and streams; subalpine and alpine regions.

11. O. saccata, Ten. ♃ .2 to .3; stem thick. Leaves lenticular-elliptical to oblong, acute, often black-spotted. Spike cylindrical, .08 to .1 long, somewhat compact; bracts *ovate-oblong*, acute, *hooded*, often purplish, *many-nerved*, longer than ovary; sepals deep purple to livid-olive, oblong, obtuse; petals narrower, as long as sepals; labellum deep purple, somewhat cuneate at base, obovate or nearly orbicular, with crenulate, undivided margin; spur thick, cylindrical, half as long as ovary — Spring — Hillsides; coast to subalpine regions and interior plateaus.

12. O. mascula, L. ♃ .5 to .8; stem stoutish. Leaves oblong to oblong-lanceolate, .1 to .2 long, obtuse to acute. Spike loose, .08 to .15 long; bracts *lanceolate-linear*, acuminate, membranous, purplish, 1-*nerved, once and a half* as long as ovary; flowers purple; sepals ovate, acute; petals narrower; labellum papillose at cuneate base, 3-lobed, lobes broad, dentate, the middle one retuse, mucronate; spur cylindrical, horizontal or ascending, about as long as ovary — July — Woods near Besherri.

13. O. Anatolica, Boiss. ♃ .15 to .4; stem slender, naked below spike. Leaves spathulate or oblanceolate [to oblong, obtuse, the uppermost linear-lanceolate, acuminate. Spike loose, .03 to .1 long; bracts] linear-lanceolate, purple, *shorter* than ovary; flowers purple; sepals and petals oblong-obtuse; labellum cuneate at base, fan-shaped, longer than sepals, 3-lobed (or rarely nearly entire), lobes obtuse, the middle one broader, retuse; spur broad at base, cylindrical, horizontal or ascending-recurved, *longer* than ovary — Spring — Hillsides; coast to middle mountain zones, and interior table-lands.

FIG. 348.

Orchis Anatolica. (*a*) Labellum. (*b*) Spur. (*c*) A sepal. (*d*) A petal.

Flowers of Orchis Anatolica. (The sepals and petals are inaccurate).

14. O. palustris, Jacq. ♃ .3 to .8; stem stiff, terete. Leaves stiff, *linear, gradually tapering from base*, .1 to .2 long, .003 to .005

broad. Spike loose, .05 to .1 long; bracts linear-lanceolate, acute, longer than ovary, 3-nerved; flowers pink; sepals and petals oblong, obtuse; labellum spreading, longer than calyx, cuneate at base, fan-shaped, 3-lobed, lateral lobes rounded, the middle one as long or longer, quadrate, usually retuse; spur cylindrical, straight, obtuse, shorter than ovary — June and July — Wet fields and swamps: plain of Esdraëlon; northern Syria, and northward.

15. O. laxiflora, Lam. ♃ .3 to .5: stem stout, hollow. Leaves oblong to linear-lanceolate, .1 to .2 long. Spike .1 to .25 long, loose; bracts linear-lanceolate, *longer than ovary, or as long, or shorter*, 3-5-nerved; flowers *deep purple;* sepals oblong; labellum cuneate at base, dilated at apex, undivided or 3-lobed, middle lobe shorter, sometimes 0, or replaced by a tooth or mucro; spur cylindrical, usually curved, as long as ovary to half as long — Spring — Swamps and damp places; lower and middle mountain zones, and tablelands.

Fig. 349.



(*a*) Bract and flower of Orchis laxiflora. (*b*) Labellum and spur.

16. O. incarnata, L. ♃ .4 to .8; stem hollow. Leaves lanceolate-linear to linear, hooded at tip, .1 to .3 long. Spike .1 to .2 or more long, cylindrical; bracts linear-lanceolate, *usually longer than flowers*; flowers *flesh-colored to pink*; sepals oblong-ovate rather obtuse; labellum 3-lobed; spur conico-cylindrical, somewhat shorter than ovary — Spring.

Var. **olochcilos,** Boiss. Labellum nearly entire — Samaria; Galilee; Cœlesyria; Lebanon; Hems.

17. O. latifolia, L. ♃ .6 to 1; stem hollow, stout. Leaves usually spotted, oblong to lanceolate, .1 to .15 long, .025 to .05 broad, obtuse to acute. Spike cylindrical, .1 to .3 long; bracts 3-nerved, the lower much longer than flowers; flowers deep purple; sepals oblong, obtuse; labellum 3-lobed to entire; spur conico-cylindrical, usually shorter than ovary — Summer — Swampy fields; Amanus, Akher Dagh, and northward.

18. O. pseudosambucina, Ten. ♃ .2 to .3; stem slender, hollow. Leaves numerous, linear, spathulate to linear-lanceolate, tapering at base, obtuse to acute, sometimes spotted. Spike .03 to .1 long, loose; bracts oblong-lanceolate, the *lowermost longer than flowers;* flowers from *light cream-colored to pinkish-purple;* sepals oblong, deflexed; labellum trilobed; spur terete, *curving upward, longer than ovary* — Spring — Rocky places; Lebanon, Antilebanon, and northward.

19. O. maculata. L. ♃ Spotted Orchis. .2 to .6; stem *solid.* Leaves usually black-spotted, oblong to lanceolate, .1 to .15 long. Spike cylindrical, dense; bracts linear-lanceolate, acute to acuminate, the lower as long as the flowers or longer; flowers light-pink to white, often purple-dotted; sepals oblong, obtuse; labellum 3-lobed, *the*

lateral lobes larger, obliquely quadrate, obtuse, crenulate; spur cylindrical, *shorter than ovary* — Spring — Aintâb.

Var. **saccigera,** Rchb. Bracts much longer than flowers; lobes of labellum more acute; spur thick, dilated, as long as ovary — Subalpine Lebanon.

6. OPHRYS, L. Ophrys. Bee-Orchis.

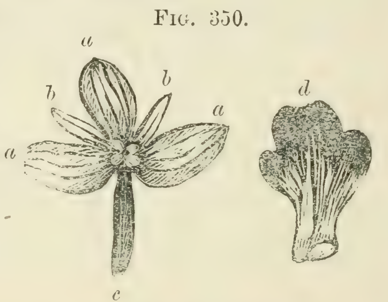
Sepals spreading. Labellum directed forward, not spurred. Column short, often ending in a beak-like process. Anthers entirely adnate, cells parallel; beak 0. Pollinia with a viscid gland at base of caudicle.

Sect. I. Musciferae. *Base of flattish labellum not gibbous, apex not appendaged.*

* *Petals glabrous.*

1. O. fusca, Link. ♃ Tawny Ophrys. Tubers ovate. Leaves oblong, glaucous. Sepals green, oblong, the upper hooded; petals ligulate; labellum cuneate, trilobed, *marked with parallel, glabrous lines, from base to middle,* otherwise *brownish-velvety,* the lateral lobes short, obtuse, the middle larger, *notched or bilobed* — February to April.

Fig. 350.



(aaa) Sepals of Ophrys fusca. (bb) Petals. (c) Ovary. (d) Labellum.

Var. **iricolor,** Rchb. Lines greenish, greyish-blue, or blue. Flowers often .03 long — Hillsides; coast to middle mountain zone.

2. O. lutea, Cav. ♃ Yellow Ophrys. Tubers nearly *globular.* Leaves oblong. Sepals yellowish-green, oblong; petals ligulate; labellum obovate, trilobed, scarcely cuneate at base, *marked with a violet, often bilobed, stripe from base to middle,* surrounded by a *purplish-velvety margin, with a glabrous, yellow rim;* the lateral lobes short, obtuse, the middle truncate, crenate, or retuse — February to April — Hillsides; coast to middle mountain zone. Flowers .01 to .02 long.

** *Petals pubescent or velvety at face.*

3. O. Speculum, Link. ♃ Mirror Ophrys. .1 to .2; tubers ovate-globular. Leaves oblong-lenticular to elliptical, glaucescent. Spike few-flowered, loose; sepals ovate-oblong, yellowish; petals *blackish-purple,* half as long as sepals, triangular, labellum obovate-cuneate, somewhat convex, trifid beyond middle, centre glabrous, glossy, blue, surrounded by a yellow band, *margin tawny, revolute, densely villous,* the lateral lobes oblong-linear, small, the intermediate much larger, oblong to ovate, obtuse or somewhat retuse, not appendaged — March and April — Hillsides; coast to alpine zones of mountains.

Sect. II. Fuciflorae. *Base of flattish or arched labellum bigibbous; tip glabrous. Petals velvety.*

4. O. tenthredinifera, Willd. ♃ Tubers ovate to oblong. Leaves oblong to oblong-lanceolate, acute. Spike loose, few-flowered; sepals oblong-elliptical, obtuse, pink, green-nerved; petals one-third to one-fourth as long as sepals, triangular, velvety at face; labellum longer than sepals, convex, obovate from cuneate base, with a conical gibbus on each side of base, *notched at apex, with an ovate, acute tooth in the notch*, velvety and *yellowish-green with the exception of a brownish, glabrous, rhomboid or quadrate spot at base*, having a cluster of hairs at the base of the tooth; tip of column *obtuse* — Spring — Chalky hills; coast and lower mountain zones.

5. O. arachnites, Scop. ♃ Spider Ophrys. .3 to .4; tubers globular. Leaves oblong to linear-lanceolate, acute. Spike loose, .1 to .15 long, 3-8-flowered; sepals ovate-oblong, pink with green lines; petals triangular, *cordate-hastate at base*, velvety, one-fifth to one-sixth as long as sepals; labellum obovate-quadrate, longer than sepals, convex, margin not folded back, bigibbous at base, *truncate at apex, and furnished near its middle with a glabrous, yellow, up-curved appendix*, and, *with the exception of obscure glabrous spots and lines with yellow borders situated near its base, velvety-tawny;* tip of column *acute* — Spring — Pastures and hillsides; coast to middle mountain zones.

Sect. III. Araniferae. *Labellum convex, with revolute margins, more or less trilobed, bigibbous at base, with a glabrous, callous tip.*

6. O. atrata, Lindl. ♃ .2 to .4; tubers ovate. Leaves oblong-lenticular, glaucescent. Spike loose, few-flowered, .05 to .1 long; sepals green, oblong-lanceolate, obtuse, spreading; petals linear, shorter than sepals, *glabrous;* labellum a little longer than sepals, obovate, convex, with reflexed margin, and two prominent gibbi or nipples at base, entire or obtusely crenulate, minutely apiculate, marked by two, parallel, blue, glabrous lines, otherwise velvety and deep blackish violet; column *acute* — Spring — Mt. Tabor and other places in Galilee; Marash, and northward.

7. O. hiulca, Sprun. ♃ .2 to .3; tubers ovate to oblong. Leaves lenticular-oblong to linear-lanceolate. Spike few-flowered; sepals *green*, oblong; petals *shorter than sepals*, linear, velvety. Labellum obovate, *blackish-purple*, marked *with 2, parallel, white or bluish, glabrous lines two-third its length, united at base by a transverse stripe*, trilobed lateral lobes obtuse, middle *broader than long*, ending in a short,

Fig. 351.



(*a*) Bract of Ophrys hiulca. (*bbb*) Sepals. (*cc*) Petals. (*d*) Ovary. (*e*) Labellum.

ascending tip: column rather *obtuse* — Spring — Coast; Kurd Dagh.

The apex of the column resembles the head of an insect, with yellow spots at each side for eyes, and a curved proboscis.

8. O. œstrifera, M.B. ♃ Gad-Fly Ophrys .2 to .4, tubers oblong. Leaves oblong-lenticular to lanceolate. Spike few-flowered; sepals oblong to oblong-ovate, *rose-purple*, with green nerves; petals linear to lanceolate, acute, or triangular, obtuse, one-fourth to one-half as long as sepals, velvety within; labellum oblong-obovate, 3-lobed, lateral lobes *triangular*, densely brown-velvety, intermediate oblong, *brown-velvety* except *the pale-green glabrous spots;* apex 3-lobed, middle lobe with *broad-upcurved appendage;* column ending *in a short or elongated straight or wavy beak* — Spring — Hillsides; coast and lower to middle mountain zones.

Fig. 352.



Bract and flower of Ophrys œstrifera.

Var. **cornuta,** Boiss. Gibbi of lateral lobes of labellum prolonged into incurved horns — Mar Mitri, Beirût, Lebanon.

9. O. bombyliflora, Link. ♃ Moth Ophrys .1 to .2; tubers globular, sessile, *with fibres bearing at their tip new tubers.* Leaves elliptical-lenticular to lanceolate. Spike loose, 1-3-6-flowered; sepals pale green, ovate; petals oblong, minute, velvety; labellum somewhat shorter than sepals, nearly orbicular, trifid, the lateral lobes *linear-oblong*, villous, the intermediate much longer, bigibbous at base, trilobed, hemispherical owing to the strongly recurved margins, brown-velvety with the exception of a smooth strip from base to recurved tip, column with short, obtuse beak — Spring — Near the Ashrafîyeh powder magazine, Beirût.

7. GYMNADENIA, R. Br. Gymnadenia.

Sepals free, spreading or connivent. Petals erect, connivent. Labellum spurred, spreading, trifid. Column short. Anther adnate, cells parallel on either side of oblong beak. Pollinia 2, caudiculate, implanted in distinct glands. Pouch 0. Ovary twisted — Tuberous herbs with aspect of Orchis.

G. conopsea, L. ♃ .3 to .5; tubers palmate, with elongated lobes; stem slender. Leaves oblong to linear-lanceolate and linear, obtuse to acute. Spike dense, .1 long; bracts lanceolate, acuminate, as long as ovary or longer; flowers pink; sepals ovate-oblong, spreading; petals half-ovate, connivent; labellum cuneate, somewhat broader than long, lobes nearly equal, ovate, obtuse or truncate; spur filiform, often twice as long as ovary; caudicles of pollinia obliquely implanted in the glands — June — Woods; Kalah-Jurn, between Kessab and Antioch.

Fig. 353.

Bract and flowers of Gymnadenia conopsea.

8. SERAPIAS, L. Serapias.

Sepals more or less connate, forming a hood; petals dilated at base, long-aristate. Labellum not spurred, with 1-2 gibbosities at base; lateral lobes erect, terminal longer, refracted. Apex of column acuminate, petaloid. Anther entirely adnate, vertical, cells parallel on either side of beak. Pollinia caudiculate. Gland 1, included in pouch. Ovary not twisted — Tuberous herbs with reddish or purplish flowers.

S. pseudocordigera, Mor. ♃ .2 to .4; tubers sessile; stem leafy. Leaves linear-lanceolate, acute. Spike loose; bracts oblong-lanceolate to ovate-lanceolate, *maroon-colored,* as long as or longer than flowers; perianth *maroon-colored;* sepals lanceolate, acuminate, united nearly to apex; petals orbiculate at base, long-acuminate labellum deeper-colored, lateral lobes half-ovate, oblique, middle oblong-lanceolate — Spring — Grassy places; maritime region to middle mountain zones and interior plateaus.

Fig. 354.

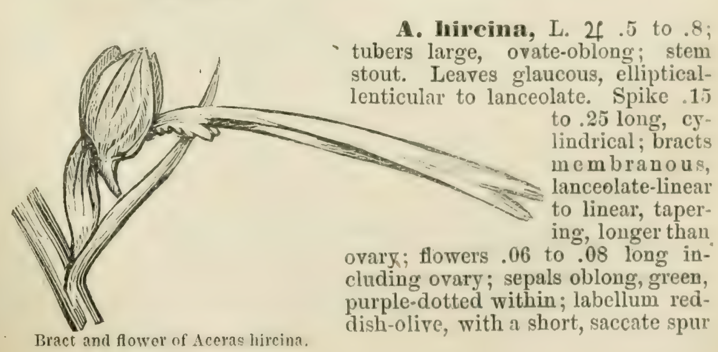


Serapias pseudocordigera. (*a*) Bract. (*b*) Sepal. (*ccc*) Petals. (*d*) Labellum.

9. ACERAS, R. Br. Aceras.

Sepals united in a hood or somewhat spreading. Petals smaller. Labellum 3-parted or -lobed, with a gibbus or spur at base, destitute of lamellæ. Column short. Anther adnate, with parallel cells. Pollinia caudiculate, both caudicles inserted on the single gland. Pouch one, 1-celled. Beak conical. Ovary twisted — Tuber-bearing herbs.

Fig. 355.



Bract and flower of Aceras hircina.

A. hircina, L. ♃ .5 to .8; tubers large, ovate-oblong; stem stout. Leaves glaucous, elliptical-lenticular to lanceolate. Spike .15 to .25 long, cylindrical; bracts membranous, lanceolate-linear to linear, tapering, longer than ovary; flowers .06 to .08 long including ovary; sepals oblong, green, purple-dotted within; labellum reddish-olive, with a short, saccate spur

at base, reflexed, 3-lobed, the undivided part oblong, wavy-margined, the lateral lobes short, semi-oblong to linear, more or less falcate, the terminal strap-shaped, longer than the rest of the flower, bifid, with lobes entire or 2-3-toothed at tip — May — Hillsides and grassy places; near Aintâb.

10. ANACAMPTIS, Rich. ANACAMPTIS.

Sepals and petals spreading, nearly alike. Labellum spreading, nearly equally 3-lobed, with a spur longer than lobes and furnished with 2, prominent, parallel lamellæ. Column short, obtuse; beak conical. Anther adnate, with parallel cells, in one pouch. Pollinia caudiculate, attached to a single, 2-lobed gland. Pouch one, 1-celled. Ovary twisted — Tuberous herbs with aspect of Orchis.

A. pyramidalis, L. ♃ .5 to .6; stem thick. Leaves linear-lanceolate, the upper sheathing. Spike dense, conical-ovate to globular, at length cylindrical; bracts linear-lanceolate, acute, pinkish, rather shorter than ovary; flowers pink, .02 long including ovary; sepals ovate-lanceolate, .006 long; petals obliquely ovate, .004 long; labellum trifid for half its length into oblong, obtuse or truncate lobes; spur slender, as long as ovary or longer — Spring — Hillsides and woods; coast to middle mountain zones.

FIG. 356.



Anacamptis pyramidalis. (aaa) Sepals. (bb) Petals. (c) Labellum and spur.

ORDER CVII. IRIDEÆ, Lindley. (IRIS FAMILY).

Herbs, with equitant, 2-ranked leaves, and regular or irregular, perfect, bracteate flowers: the divisions of the 6-cleft or -parted, petaloid perigonium convolute in the bud, in two sets, the tube nearly or quite coherent with the 3-celled ovary; stamens 3, distinct or monadelphous, inserted at base of exterior lobes of perigonium; anthers extrorse. Flowers generally showy, from a 2-leaved spathe. Style 1. Stigmas 3, simple, lobed, or petaloid. Pod loculicidal, many seeded. Seeds anatropous; embryo straight, in fleshy albumen. Root-stocks or tubers mostly acrid.

* *Perigonium regular.*

† *Styles 3, more or less united at base.*

1. IRIS. Stigmas dilated, petal-like, covering the stamens, with a stigmatose, transverse line at lower surface.

† † *Style 1, filiform, stigmas 3, more or less lobed or dissected.*

2. CROCUS. Branches of stigma 3, nearly entire, fringed, or dissected.
3. ROMULEA. Stigmas 3, bilobed, bifid, or bipartite.

* * *Perigonium irregular. Stamens one-sided, curved.*

4. GLADIOLUS. Style filiform; stigmas 3, spathulate-dilated from a filiform base.

1. IRIS, L. Flower-de-Luce. Iris. *Susan.*

Perigonium tubular at base, regular, 6-cleft; the outer 3 divisions spreading or reflexed; the inner 3 generally erect. Stamens 3, distinct, inserted at the base of the outer divisions of the perigonium, the anthers extrorse, under the petaloid stigmas. Pod 3-celled; ovules numerous, implanted in central placentæ -- Perennial herbs, with creeping or tuberous root-stocks, sword-shaped, or grassy leaves, and large showy flowers.

Fig. 357.



(*a*) Plant of the genus Iris, showing the roots, the equitant leaves, and the flower. (*b*) Tip of the style, showing the petaloid stigmas, and the stamens below them, with their extrorse anthers. (c) Longitudinal section of the ovary, with two, equitant leaves. (*d*) Transverse section of the ovary. (*e*) A seed. (*f*) A longitudinal section of the same showing the embryo in its fleshy albumen

* *Root a bulb, with a fibrous envelope.*

† *Inner divisions of perigonium erect, nearly as long as outer.*

‡ *Filaments at lower part monadelphous and united with style.*

1 I. Sisyrinchium.

‡ ‡ *Filaments free.*

2 I. histrio.

† † *Inner divisions of perigonium small, horizontal or deflexed. Filaments free along their whole length.*

3 I. Palæstina, 4 fumosa.

* * *Root-stock composed of naked, oblique or creeping tubers and fibres. Ovary 3-celled.*

† *Neither outer nor inner divisions of perigonium bearded.*

‡ *Stemless. Flowers lilac-purple.*

5 I. Cretensis.

‡ ‡ *Stemmed. Capsule triquetrous. Flowers yellow.*

6 I. pseudoacorus.

‡ ‡ ‡ *Stemmed. Capsule hexagonal. Flowers yellowish-white.*

7 I. ochroleuca.

† † *Inner face of lower part of outer division of perigonium hairy, but not regularly bearded along the median line.*

8 I. Sari, 9 Lorteti, 10 Helenæ.

† † † *Inner face of lower part of outer divisions of perigonium bearded along the middle line.*

11 I. pallida.

1. I. Sisyrinchium, L. ♃ *Zambaq. 'Onseil, Khaitah.* .3 to .4; bulb ovate; stem slender, wavy. Leaves usually 2, longer than flowers, linear-sickle-shaped, leathery, *rounded at back.* Raceme 2-4-flowered; *spathe scarious,* inflated, acuminate; flower .03 to .04 long; ovary nearly sessile; tube of perigonium slender, longer than ovary; limb blue; outer divisions obovate-spathulate, lamina reflexed, *yellow- or white-spotted at base,* claw marked with a pubescent line: inner divisions erect, lanceolate, obtuse; stigmas deeply bi-lobed — Early spring — Plains, and lower mountain regions; common even in the Tîh.

Var. **monophylla,** Held. Leaf one, very narrow. Stem lower. Perigonium dirty-yellowish — Southern Palestine, and southward to Egypt.

2. I. histrio, Rchb. ♃ .15 to .2; bulb ovate, the longitudinal fibres connected by oblique ones. Leaves 1-2, linear-tetragonal, grooved at face, longer than flowers. Spathe 1-flowered, linear, acute; tube of perigonium exserted, three to four times as long as short-pedicelled ovary; limb blue; laminæ of outer divisions reflexed, oblong, somewhat shorter than the claw, *with a golden disk and oblique veins ending near the margin in deep violet spots;* inner divisions oblanceolate, erect; lobes of stigma lanceolate, the outer margin often crenate — January to March — Lower to middle mountain zones and interior plateaus.

3. I. Palæstina, Baker. ♃ .2 to .3; coats of bulb membranous, produced beyond the neck; *stem very short or* 0, 1-3-flowered. Leaves 5-6, in two rows, lanceolate to lanceolate-linear, falcate-recurved, acuminate, folded, margin cartilaginous, ciliate. Spathes 1-flowered, lanceolate, long-tapering-cuspidate; tube of perigonium four to five times as long as sessile ovary, somewhat exserted; limb *whitish-yellow with pale lilac tinge,* .04 long, two-thirds as long as tube, the outer divisions oblong, *the upper fourth recurved,* the inner divisions small, lanceolate to linear-lanceolate, deflexed; stigmas as long as outer lobes, bifid near tip into oblong-triangular, acute lobes — January to April — Common throughout. Flowers sweet-smelling.

Var. **cærulea,** Post. Flowers more or less deep-blue or purple — Syrian Desert.

4. I. fumosa, Boiss. et Haussk. ♃ .2 to .3, coats of ovate bulb produced along stem; stem *many-leaved*, 8-10-flowered. Leaves glaucescent, *broad-lanceolate*, acute, .1 to .15 long, .02 to .04 broad at base, falcate-recurved, folded, the upper narrower. Flowers solitary in axils; spathes tubular, slightly inflated, acuminate; tube of perigonium .04 to .06 long, slightly exserted, four times as long as ovary, twice as long as limb; limb *greenish-cream-color, more or less smoky*, .03 to .04 long, outer lobes oblanceolate-spathulate, *recurved a little above middle, with a longitudinal, crest-like, elevated, yellow line* along their middle; inner lobes minute, deflexed, clawed, *spathulate and dentate-fringed at tip ;* stigmas oblong, concave, lobes ovate *eroded-dentate*, somewhat shorter than outer lobes of perigonium — March — Fields; Aleppo and Tourmanîn.

5. I. Cretensis, Janka. ♃ Root-stock creeping, short-branched. Leaves all radical, tufted, linear, erect, acute, somewhat leathery, thickly striate, as long as flowers or somewhat longer; stem nearly 0. Spathe 1-flowered, valves lanceolate, acuminate; tube of perigonium somewhat exserted, much longer than oblong, sessile ovary; limb one-half to two-thirds as long as tube, divisions all of equal length, lilac-purple, the lamina of the outer deflexed, half as long as claw, ovate-oblong, with a yellow base marked with oblique lilac veins; inner divisions erect, of uniform color, oblong; lobes of stigma narrow-lanceolate, serrulate at outer edge, two-thirds as long as perigonium — Early spring — Qodmûs (Nusairy mountains); Beilân, and northward.

6. I. pseudoacorus, L. ♃ 1 or more; root-stock thick, oblique; stem terete, somewhat flattened, alternately branched. Leaves sword-shaped, acute, the lower nearly as long as stem, the upper shorter. Branches stiff, ending in spathes, the lower elongated, the others gradually shorter. Spathe 2-leaved, 2-3-flowered, valves *oblong-lanceolate, obtuse or acutish ;* tube of perigonium half as long as ovary; limb *deep yellow*, the outer divisions ovate, obtuse, reflexed, longer than claw, with *tawny-spots and radiating purple veins at base of lamina ;* inner divisions *one-third as long as outer*, oblanceolate-spathulate, erect; stigmas shorter than outer divisions, bifid into acute lobes dentate at tip; capsule *obtusely 3-angled* — Summer — Streams and marshes; common.

7. I. ochroleuca, L. ♃ 1 or more; root-stock thick, short, oblique; stem terete, bearing 2-4 spathes near the top. Leaves sword-shaped, about as long as stem, glaucescent, the upper smaller. Spathe 2-3-flowered, valves *lanceolate, acuminate ;* tube of perigonium *somewhat longer than ovary ;* lamina of outer divisions wavy, reflexed, obovate, *yellowish white at centre with deeper yellow veins, and whitish at margin, as long as yellow claw ;* inner divisions *about as long as outer*, oblanceolate, obtuse, yellow along the middle line, white at margin; stigmas scarcely longer than claw of outer divisions, bifid into semi-ovate, acute lobes; capsule long-beaked, *hexagonal* — Summer — Wet places; coast.

8. I. Sari, Schott. ♃ Root-stock short, oblique; stem .3 to .5, 1-flowered. Leaves linear, elongated, straight or slightly curved, rather obtuse. Valves of spathe lanceolate, as long as tube; tube of perigonium *somewhat longer than sessile*, cylindrical ovary; limb *deep-lilac or lead-color*, outer divisions oblong, clawed, ascending-spreading,

hairy to middle; inner divisions somewhat longer, erect, orbicular-obovate, curved, stigmas of one color, broad — Spring — Moab; Hûleh. Flowers often .15 broad, drying purple.

I. Heylandiana, Boiss., said by Tristram to be found in the Orontes Plain, is probably this species.

9. I. Lorteti, W. Barb. ♃ Root-stock short; stem .3 to .4, 1-flowered. Leaves linear, erect, *as long as stem*, valves of spathe lanceolate, somewhat longer than tube of perigonium; tube twice as long as sessile, cylindrical ovary; outer divisions of limb oblong-obovate, reflexed, lead-colored *with maroon-colored spots, and a deep brownish-red facet near base*, sparingly hairy; inner divisions somewhat longer, erect, *orbicular*, *pale pink with deeper pink veins;* stigmas *maroon-colored* — May — Dry, bushy places; southern Lebanon. Flowers .1 broad. Perhaps a variety of the last.

10. I. Helenæ, W. Barb. ♃ .2 to .3; root-stock short; stem slender, 1-flowered. Leaves, *with the exception of a spathe-like leaf half way up, all nearly radical*, linear, *falcate, curved so as to leave the stem standing out from the tuft.* Valves of spathe lanceolate, longer than tube of perigonium; limb lilac to pink; outer divisions erect-spreading, obovate-oblong, deep purple at claw and along middle, and clothed at its lower part, and especially along claw, with elongated, scattered, deep purple papillæ; inner divisions somewhat larger, erect, *obovate*, lilac to pink with deeper pink lines — Spring — Sandy places; et-Tîh; Moab; Syrian Desert between Qaryetein and Palmyra; Aintâb. Flowers .08 to .1 broad.

I. Haynei, Baker, is probably a variety of this or of the last.

11. I. pallida, Lam. ♃ Root-stock creeping; stem tall, with many spathes, much taller than broad-sword-shaped leaves. Valves of spathe oblong, scarious even before flowering; tube of perigonium as long as short-pedicelled, cylindrical ovary; limb pale-violet; divisions broad, the outer deflexed, broad-obovate, yellow-bearded within with deeper-colored veins; inner divisions erect, as long as outer; lobes of stigma half-ovate, acute, dentate at outer aspect — June — Fields; northern Palestine; Tripoli. Flowers sweet-smelling.

I. Germanica, L., is extensively cultivated, especially in cemeteries, and is occasionally found in fields, in all probability escaped from cultivation.

I. Florentina, L., is also cultivated, and occasionally found near dwellings.

I. tuberosa, L., is said by Tristram to be found in the hilly districts. It is probably an escape from cultivation.

CROCUS, L. Crocus. *Za'farân. Curcum.*

Perigonium funnel-shaped, erect, with a long tube, and six-parted limb with divisions all alike, or the interior a little smaller. Stamens 3, included, filaments straight, anthers linear-sagittate. Style filiform, exserted from tube, with 3 branches, usually more or less divided. Capsule chartaceous, oblong-pyramidal, 3-valved. Seeds with membran-

ous testa and horny albumen — Stemless herbs, with a corm covered with membranous tunics, and with linear leaves, appearing with or after the flowers, naked at base or having a spathe which encloses one or more scapes each with a spathe at the base of the ovary.

* *Basal spathe arising from apex of corm, enclosing scapes. Tunics of corm with parallel fibres.*

1. C. ochroleucus, Boiss. et Gaill. ♃ Cream-colored Crocus. Outer tunics of corm firm, brown, inner membranous, thin. Leaves *appearing with flowers.* Flowers pale *cream-colored or lilac;* tube of perigonium twice as long as *elongated-elliptical* divisions, throat *yellow*, bearded; stigmas slightly dilated, short-3-4-lobed — October to February — Rocky places; Phœnician coast; Lebanon and Antilebanon; Galilee.

2. C. zonatus, J. Gay. ♃ Ringed Crocus. Tunics thin, pale, membranous. Leaves *appearing after flowers.* Flowers *pale lilac;* tube of perigonium twice to thrice as long as *obovate-elliptical*, obtuse divisions; divisions with 7-9 deeper-colored nerves, *provided with two orange-bearded spots at base*, forming *a ring* at throat of perigonium; stigmas club-shaped, very short-lobed, or occasionally dissected — September to November — Subalpine and Alpine Lebanon and Hermon; Aintâb.

* * *Basal spathe* 0.

† *Tunics of corm composed of netted fibres.*

3. C. cancellatus, Herb. Bot. ♃ Fibres of tunic continued along the stem as thick bristles; areolæ *rectangular to rhomboidal.* Leaves appearing *after flowers.* Flowers with white tube twice as long as *whitish to lilac or pink limb;* divisions .04 long, oblong-elliptical, obtuse, with deeper colored striæ; throat glabrous; anthers yellow, four times as long as filament; stigmas longer than anthers, *dissected* into lobes somewhat dilated at tip — September to December — Subalpine to alpine Lebanon and Antilebanon; Damascus; Amanus; Aintâb. The corm is edible, and sold in the streets of Damascus and other cities.

4. C. Ancyrensis, G. Maw. ♃ Corm ovate-pyriform, fibres thick, broad, joined by a thin membrane; areolæ *linear.* Leaves appearing *with the flowers.* Spathe of two leaves, exserted from sheath. Tube of perigonium twice to thrice as long as *yellow* limb; divisions .02 long, oblong-elliptical, obtuse; throat glabrous; anthers puberulent, thrice as long as filament; stigmas *orange-colored*, longer than anthers, *thickened, slightly lobed* — Spring — Akher Dagh.

† † *Tunics of corm composed of parallel fibres at length separating into strips.*

‡ *Flowers appearing in winter and spring.*

§ *Flowers white, or tinged with lilac.*

5. C. Gaillardotti, Boiss. et Gaill. et Bl. ♃ Corm oblong-conical. Leaves *filiform, at length circinnate-recurved*, appearing with the flowers. Tube of perigonium slender, twice as long as limb; divisions scarcely .02 long, narrow-elliptical, *pale-lilac at outer face*,

white at inner; throat glabrous, yellow; filament yellow, shorter than white anther; stigmas pale orange-colored, dissected into *thickish* lobes, *shorter than anthers* — December and January — Coast to middle mountain zones, and interior plains.

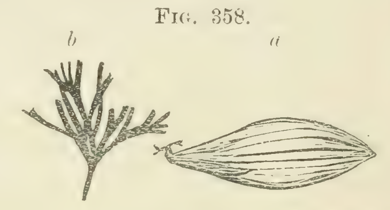
6. **C. hyemalis,** Boiss. et Bl. ♃ Corm ovate-conical; tunics somewhat coriaceous, at length splitting into linear strips below. Leaves appearing with flowers, erect or erect-spreading, at length longer than flowers. Flowers 2-3, from a bivalved spathe; tube of perigonium once and a half to twice as long as limb; divisions .015 to .03 long, lenticular-oblong, acute, whitish within, the outer lilac-banded, and sometimes also spotted without; throat orange-colored, glabrous; filament half as long as brownish anther; stigmas orange-colored, dissected into *slender* lobes, *a little longer than anther* — December to April — Coast and lower mountain zones; Aintâb.

Var. **Foxii**, Maw. Anthers deep black — Near Jericho.

§ *Flowers orange-yellow.*

7. **C. vitellinus,** Wahl. ♃ Tunics of corm splitting into narrow, linear, flat bands. Leaves appearing with flowers, .003 broad, often at length .3 long, with broad sheaths at base. Spathe 2-leaved, shorter than tube, limb orange-colored, .025 long, one-third as long as tube, divisions oblong-lenticular; throat glabrous; filaments hirsute at base; stigma as long as stamens, much dissected — December to February — Syrian coast to middle mountain zones, and interior plains.

Fig. 358.



(*a*) Petal of Crocus vitellinus. (*b*) Style and stigmata.

Var. **vittatus,** Post. Divisions of limb feathered with bronze and blackish stripes — More common in northern Syria. Said by Boissier to have the odor of Sambucus, and treated as a species under the name of **C. graveolens**, Boiss. et Reut.

‡ ‡ *Flowers appearing in autumn.*

8. **C. Hermoneus**, Ky. ♃ Corm pear-shaped; tunics thin, membranous, with parallel, fibrous, obsoletely reticulate bands, produced at tip into cusps. Leaves appearing after flowers, glabrous, elongated in the fruiting plant; tube of perigonium thrice as long as white limb; divisions oblong-elliptical, acutish; filaments one-fourth as long as anthers, dissected into few, capillary lobes; capsule elongated-oblong — October — Top of Mount Hermon.

3. ROMULEA, Maratti. Romulea.

Perigonium regular, corolla-like, funnel-shaped, with short tube, and six-parted, spreading limb. Stamens 3, free, erect, anthers fixed at base, dehiscent outwardly. Ovary inferior, triquetrous, 3-celled, with numerous ovules implanted at the central angle. Style filiform, with three, short-lobed, bifid, or bipartite stigmas. Capsule membranous, triquetrous. Seeds nearly globular or angled — Caulescent, bulbous herbs, with flowers solitary in a two-leaved spathe, or few, corymbose.

1. R. Bulbocodium, L. ♃ *Hirsenneh.* Tunics deep brown, *leathery.* Leaves linear, grooved at upper surface, erect or recurved, *nearly twice as long* as scape. Scape .1 to .3, 1-3-flowered. Valves of spathe lanceolate, unequal, the upper *hyaline;* perigonium about twice as long as spathe, *pale violet to white,* yellow toward base; divisions oblong-elliptical to lenticular, .02 to .03 long; throat hairy; stamens shorter than style, filaments pubescent; stigma nearly equally 6-lobed; capsule ovate, .01 long, obtusely triquetrous; seeds *smooth* — January to April — Sandy and rocky places; coast to middle mountain zones, and interior plains.

2. R. nivalis, Boiss. et Ky. ♃ Tunics *parchment-like.* Leaves linear, plicate, spreading-recurved, *only a little longer* than flowers. Scape .06 to .1, 1-2-flowered; valves of spathe, linear-lanceolate, herbaceous, margin narrowly, membranous; perigonium .01 to .02 long, about twice as long as spathe, *orange-yellow with violet lines for two-thirds of their length,* the rest violet; divisions oblong-elliptical; stamens shorter than *trifid* stigma; capsule ovate, .006 to .007 long; seeds *wrinkled-tubercled* — April to August — Subalpine Lebanon and Antilebanon.

3. R. Columnæ, Seb. et Maur. ♃ Tunics *leathery* brown. Leaves linear, grooved, at upper surface, erect or recurved, much longer than flowers. Scape .06 to .1, 1-3-flowered; upper valve of spathe broad hyaline-margined; perigonium .01 long, scarcely longer than spathe, *pale blue to white,* lemon-colored, glabrous at throat; divisions *oblong-lanceolate,* acute, with three, deeper-colored lines; filaments glabrous or sparingly hairy at inner face; branches of style 3, bilobed; capsule *ovoid-hexagonal,* seeds somewhat tubercled — February — Syrian coast.

4. GLADIOLUS, L. Sword Lily.

Perigonium petaloid, irregular, with short tube, and six divisions, bilabiate. Stamens 3, inserted at the apex of the tube, included, lying under the upper divisions of the perianth. Anthers linear, bifid a little above the base, extrorse, the filament being inserted on their dorsal aspect, at the apex of the cleft. Ovary inferior, 3-celled, the cells many-ovuled. Style filiform: stigmas 3, filiform at base, dilated-spathulate at apex. Capsule membranous, loculicidal. Seeds compressed and winged, or globular-pear-shaped and wingless — Bulbous herbs, with solitary flowers, arranged in a two-ranked or one-sided spike. Probably the species of this genus are "the lilies of the field," *Matt.* vi. 28.

* *Nerves of leaves irregular, not parallel. Flowers pink.*

† *Seeds globular-pyriform, not winged.*

1. G. segetum, Gaul. ♃ .6 to 1 or more. Spike of flowers loose, flexuous, somewhat one-sided; valves of spathe unequal; lamina of divisions of perigonium *oblong-spathulate; anthers longer than filament;* stigmas *gradually dilated* into an oblong lamina; capsule umbilicate at apex, 3-grooved — Spring — Fields among grain; common.

† † *Seeds compressed, winged.*

2. G. Illyricus, Koch. ♃ .6 to 1. Spike short, few-flowered, loose, in two rows; valves of spathe *unequal;* divisions of perigonium with long, slender claw, and *rhombic-oblong lamina; anthers shorter than*

filament; stigmas linear to middle, *suddenly* dilated into *a roundish ovate* lamina; capsule obovate, triquetrous — Spring — Fields among grain; common.

Var. **Anatolicus,** Boiss. The divisions of the upper lip shorter, the lower of them narrower. Filaments scarcely longer than anthers.

3. G. imbricatus, L. ♃ .6 to .1; stem slender, about 2-leaved, the lower leaf often obtuse. Spike *dense,* one-sided; leaves of spathe lanceolate, *nearly equal*; lamina of divisions *obovate, somewhat connivent*; anthers shorter than filament; stigmas *oblanceolate, gradually tapering from base;* capsule obovate, obtusely triquetrous — Spring.

Var. **Libanoticus,** Boiss. Valves of spathe short, with prominent nerves; spike few-flowered — Antilebanon above Zebedani.

* * *Nerves of narrowly linear leaves parallel. Flowers dark-purple or violet.*

4. G. atroviolaceus, Boiss. ♃ .6 to 1; spike short, one-sided, densely 5-7-flowered; valves of spathe unequal; lamina of divisions oblong-spathulate; anthers as long as filament or longer; stigmas linear to middle, then dilated into a spathulate lamina; capsule *oblong,* retuse, trisulcate, torulose — Spring — Grain fields and stony places; common, especially northward.

Tristram says that **G. Byzantinus** is found in the Galilean hills.

ORDER CVIII. AMARYLLIDEÆ, R. Br. (AMARYLLIS FAMILY).

Bulbous herbs, not scurfy or woolly, with linear, flat leaves, and regular (or nearly regular) perfect, 6-androus flowers, included in spathaceous bracts, the tube of the coralline perigonium coherent with the nearly or quite 3-celled ovary; the lobes imbricated in the bud — Limb of perigonium 6-parted, or tubular-funnel-shaped. Stamens implanted on epigynous disk, or inserted on the tube of the perigonium or at its throat, opposite to its lobes. Anthers introrse. Style simple, stigma entire or 3-lobed. Capsule loculicidal, the valves bearing septa along their middle. Seeds horizontal or pendulous, globular, compressed, or angled, the testa thin, membranous, often winged, sometimes thickened and fleshy. Embryo in axis of albumen, usually much shorter — Scape bearing or caulescent plants.

* *Bulbous, scape bearing herbs.*

† *Throat of perigonium destitute of a crown.*

1. STERNBERGIA. Flowers erect, yellow, with striate divisions of perigonium.

3. GALANTHUS. Flowers nodding, white usually green-spotted.

† † *Throat of perigonium furnished with a cup-shaped or bell-shaped crown.*

2. NARCISSUS. Limb of white perigonium salver-shaped. Crown cup-shaped, obtusely lobed.

4. PANCRATIUM. Limb of white perigonium funnel-shaped. Crown campanulate, toothed.

* * *Bulbous, caulescent herbs. Perigonium destitute of a crown.*

5. IXIOLIRION. Perigonium light-blue, divided nearly to ovary.

1. STERNBERGIA, W. K. Sternbergia.

Perigonium enclosed in a 1-flowered spathe, funnel-shaped, the tube straight, gradually expanding, the limb regular, 6-parted. Filaments 6, inserted at the top of the tube, filiform, 3 of them long and 3 short. Style 3-angled, stigma 3-lobed. Ovary 3-celled, the seeds numerous, in two rows in each cell. Capsule somewhat fleshy, 3-celled, indehiscent. Seeds nearly globular — Herbs with bulbs covered with membranous coatings, scapes bearing yellow flowers.

1. S. pulchella, Boiss. et Bl. ♃ .05 to .1; bulb .02 long, .01 in diameter. Leaves 3-4, appearing *with the flowers*, narrowly *linear*, scabrous-margined, obtuse or acutish, spreading-recurved. Flowers .015 long; tube about as long as spathe, divisions *oblong-linear*, about as long as tube; stamens two-thirds as long as limb — Autumn — Dry hillsides; lower zones of Lebanon and Amanus, and eastward.

2. S. Fischeriana, Herb. Amar. ♃ .3 to .5; bulb .04 to .05 long, .025 in diameter. Leaves appearing *with the flowers*, strap-shaped, .006 to .01 broad, about as long as scape or shorter. Spathe ovate-lanceolate, tubular at base, two-thirds as long as perigonium; flowers .04 long; tube .02 long, thick, abruptly dilated into a funnel-shaped limb; divisions *oblong-elliptical*, obtuse, sometimes mucronulate, twice to thrice as long as tube above ovary; ovary oblong-ellipsoidal, tapering at both ends, stipitate — Spring — Cassius to Akher Dagh, and northward.

3. S. Clusiana, Gawl. ♃ .3 to .4; bulb large. Leaves appearing *after flowers*, strap-shaped, .006 to .01 broad, somewhat twisted, glaucescent, .2 to .3 long; much longer than scape. Scape .04 to .07 long, covered with prolongation of tunics of bulb; spathe linear, tubular below, sometimes split at apex, somewhat longer than tube of perigonium; tube .04 to .06 long; limb spreading; divisions *obovate-elliptical*, .06 long, .02 to .03 broad, obtuse. *sometimes short-apiculate;* longer filaments once and a half as long as limb; ovary elliptical, somewhat stipitate within the spathe — November and December — Middle to subalpine mountain regions; Mount Hor.

2. GALANTHUS, L. Snowdrop.

Spathe 1-flowered, perigonium superior, limb 6-parted, the outer three divisions longer, spreading, the inner shorter, erect, connivent. Stamens six, inserted at throat of perigonium, included; filaments very short; anthers erect, tapering and dehiscent at tip, often produced into a subulate point. Ovary 3-celled, cells many ovuled. Capsule fleshy, at length 3-valved, loculicidally dehiscent. Seeds nearly globular — Scape-bearing herbs, the bulbs coated with brown tunics, the flowers white, usually green-spotted.

G. nivalis, L. ♃ .2 to .3, the radical sheath truncate, short-cleft. Leaves 2, strap-shaped, appearing with the flowers, .006 to .01 broad, obtuse, somewhat grooved. Scape 1-flowered, a little longer than leaves; flower *nodding;* the outer divisions white, oblong-elliptical, obtuse, narrowed at base, the inner *half as long*, obovate-cuneate, *obcordate*, white, *with a semicircular, green, white-bordered spot*, the lobes quite obtuse; stamens about half as long as inner divisions; filaments

one-fourth as long as subulate-tipped anthers — Spring — Kurd Dagh; Aintâb.

3. NARCISSUS, L. Narcissus. *Nerjis.*

Perigonium with long tube and salver-shaped, six-parted limb. Crown campanulate or cup-shaped, entire, crenulate, or parted. Stamens inserted on tube of perigonium below the crown, free from it, the anthers fixed by the middle of their dorsal surface. Ovary ovate or oblong, triquetrous, cells 3, many-ovuled; style filiform; stigma truncate or somewhat 3-lobed. Capsule loculicidally 3-valved. Seeds nearly globular or angled — Bulbous herbs, flowers several or 1 in a single spathe.

1. N. Tazetta, L. ♃ *Nerjis. Renjis. Girundus.* Leaves 2-6, glaucescent, *strap-shaped*, .003 to .01 broad, obtuse, flattish, usually shorter than scape, *coming with the flowers.* Scape 3-10-flowered, the pedicels unequal, the longer ones longer than the flowers and the *oblong* spathe; tube of perigonium somewhat longer than the spreading, white to cream-colored, .015 to .03 long, divisions; three of the divisions obtuse, muticous or mucronulate, and the alternate ones apiculate; crown golden, cup-shaped, one-fifth to one-half as long as divisions of perigonium — November to March — Coast to middle mountain zones and interior plateaus. Probably the *Rose of Sharon* (Cant. ii. 1). Among the forms, considered by Boissier as varieties, are :—

Var. **typicus,** Boiss. Divisions of perigonium *ovate to oblong-elliptical;* crown one-third as long as divisions, *nearly entire.*

Var. **Syriacus,** Boiss. Divisions of perigonium *oblong;* crown *obsoletely lobed,* one-fourth to one-fifth as long as divisions.

Var. **Cypri,** Boiss. Scape tall; bulb larger; flowers larger; crown open, entire, one-third as long as divisions.

2. N. serotinus, L. ♃ Leaves 1-2, *filiform*, grooved at upper surface, *coming after the flowers.* Scape slender; flowers 1, rarely 2, on pedicels shorter than the *linear* spathe; tube of the perigonium slender, divisions white, oblong to oblong-lanceolate, .01 long, acute or mucronate, shorter than tube; crown very short, yellow, *trifid*, with obtuse, retuse lobes — Autumn — Near Tripoli.

4. PANCRATIUM, L. Pancratium.

Perigonium with long tube and funnel-shaped, equally six-lobed limb. Crown campanulate, adnate to perigonium below, split into teeth. Stamens adnate to inner face of corolla, free or adnate to crown, the anthers fastened by the middle of their back. Ovary 3-celled cells ∞-ovuled; style filiform, stigma somewhat 3-lobed. Capsule ovate-triquetrous, loculicidally 3-valved. Seeds nearly globular, crustaceous — Perennial with large bulb, and white flowers included in a spathe.

1. P. maritimum, L. ♃ .5 to .7. Leaves appearing *soon after* flowers, erect, broad-linear, *glaucous*, nearly as long as scape. Spathe 2-valved, lanceolate, *one-third to one-fourth* as long as flowers; flowers 2-8 in spathe, .1 to .15 long, nearly sessile; tube of perigonium expanding gradually, longer than limb; lobes lanceolate-linear, spreading-

reflexed, marked with a green stripe along middle line; teeth of crown 12, triangular, acute, shorter than lobes — October — Sands of coast.

2. P. parviflorum, Dec. ♃ .3 to .4. Leaves appearing *after* flowers, linear, .01 broad, *deep-green with a white band along middle,* recurved, about as long as scape. Spathe 2-valved, lanceolate, *two-thirds* as long as flowers; flowers 4-10 in spathe, .05 long, pedicels longer than ovary; tube of perigonium about as long as limb, slender; lobes linear-lanceolate, spreading; teeth of crown 12, linear-lanceolate, half as long as lobes; anthers exserted from throat -- October to December — Fissures of rocks and walls along coast.

3. P. Sickenbergeri, Asch. et Schweinf. ♃ *Aisṣalân.* .3 to .4. Leaves appearing *after* flowers, *glaucous,* linear, *contorted,* .005 to .008 broad, somewhat longer than scape. Spathe 2-valved, narrowly lanceolate, a little longer than ovary; flowers 4-8 in spathe, .06 to .08 long; pedicels somewhat shorter than ovary; tube of perigonium slender, *two-thirds* as long as limb; lobes lanceolate, the outer acutish, the inner retuse; teeth of crown much shorter than lobes, short-ovate, bifid into triangular, acute toothlets; filaments longer than crown, shorter than lobes -- October -- Sands of southern deserts, and around Dead Sea.

5. IXIOLIRION, Fisch. Ixiolirion.

Perigonium funnel-shaped, divided nearly to ovary into 6-lobes. Stamens 6, inserted at base of lobes, included; filaments subulate; anthers straight, perforated at base for reception of filament. Ovary 3-celled, cells ∞ -ovuled; style filiform; stigmas 3, short-filiform, spreading-revolute. Capsule oblong-club-shaped, tapering at base, loculicidally 3-valved. Seeds ovate-oblong -- Perennial herbs with scarious-coated bulbs, and handsome, blue flowers, and leafy stems.

1. montanum, Lab. ♃ .3 to .6; stem flexuous, ending in a loose panicle. Peduncles axillary, stiff, 1-2-flowered; pedicels as long as flowers or shorter, the terminal flowers often somewhat corymbose. Leaves linear, .005 to .008 broad, the upper tapering, longer than axillary flowers. Perigonium .05 long, blue, funnel-shaped from base, divisions oblong-linear, tapering at base, 3-nerved, *the outer long-mucronate,* the inner obtuse -- Spring -- Hillsides and fields; coast to subalpine regions and interior plains.

Order CIX. DIOSCOREACEÆ, R. Br. (Yam Family.)

Plants with twining stems, from large, tuberous roots or knotted root-stocks, and ribbed and netted-veined, petioled leaves, small, diœcious, 6-androus, regular flowers, with the 6-cleft, calyx-like perigonium adherent in the fertile plant to the 3-celled ovary. Styles 3, distinct — Tube of staminate corolla very short. Anthers fixed by the base of their dorsal aspect, introrsely dehiscent. Cells of ovary 2-1-ovuled. Ovules anatropous, suspended at the inner angle. Fruit (in ours) a 3-, or, by abortion, 1-celled berry, with globular seeds. Embryo minute, situated in a cavity near the umbilicus.

TAMUS, L. BLACK BRYONY.

Staminate flowers. Perigonium campanulate, six-parted to middle. Stamens 6, inserted at bottom of tube, with thread-like filaments. Anthers ovate-globular, twin-celled. *Pistillate flowers.* Ovary top-shaped, capped by the persistent limb; filaments abortive; cells 2-ovuled; style 3-fid, stigmas dilated, bifid, reflexed. Berry globular, fleshy, covered by the tube of the perigonium — Climbing, twining herbs, with a long, fleshy, tuberous root.

T. communis, L. Black Bryony. ♃ Leaves cordate, sometimes obscurely 3-lobed, acuminate, .03 to .06 long and broad. Racemes axillary; the *staminate* dense, many-flowered, longer than leaves, flowers long-pedicelled; *the pistillate* short, few-flowered, flowers short-pedicelled; berries globular, .008 in diameter — May — Shrubby and shady places; common to middle and subalpine regions.

Var. **Cretica**, Boiss. Leaves more or less 3-lobed, the middle lobe long-tapering — Hardly a variety, much less a species (*T. Cretica, L.*)

ORDER CX. SMILACEÆ. (SMILAX FAMILY.)

Shrubby (or rarely herbaceous) plants, climbing or supported by a pair of tendrils on the petiole of the ribbed or netted-veined, simple leaves, with diœcious (or rarely perfect) small flowers, the perigonium corolla-like, greenish, parted into 6, *deciduous divisions, free from the ovary; stamens* 6 (*or more or less*), *with introrse,* 2-*celled anthers, appearing when opened* 1-*celled*; *ovary with* 3 *cells, free, ovules* 1-2 *in each cell, suspended from the inner and upper angle, orthotropous; style* 0, *stigmas* 3, *spreading, sessile* — Anthers fixed by base. Berry globular, 6-1-seeded. Seeds elliptical or globular, with thin testa, and small embryo in the midst of copious, horny albumen.

SMILAX, L. GREEN BRIER. CAT BRIER. *Hashishat-el-Batûr.*

Staminate flowers. Stamens inserted at bottom of perigonium, equal. *Pistillate flowers.* Stamens abortive, deciduous. Ovary elliptical, with 3 cells and 1-2 ovules in each, pendulous from tip of cell; style 0; stigmas 3, distinct, papillose, recurved, deciduous. Berry globular, with 1-3, globular seeds — Evergreen, climbing shrubs, ours prickly, with alternate leaves usually in two rows, umbelled flowers, the umbels solitary in the axils or racemed.

S. aspera, L. ♄ Glabrous; branches angled, flexuous, prickly. Leaves leathery, hastate to cordate-ovate, .05 to .1 long, prickly at margin and midrib of lower surface; tendrils inserted above the base of the petiole. Umbels sessile, many-flowered, in leafless, axillary and terminal racemes; berries crimson — Common everywhere in hedges and thickets from coast to middle mountain zones and interior plains.

Var. **Mauretanica**, Boiss. Stem less prickly. Leaves unarmed or less prickly, more rounded — Common.

ORDER CXI. ASPARAGACEÆ, Baker. (ASPARAGUS FAMILY.)

Herbs or shrubs, never with bulbs, with perfect, monœcious, or polygamous flowers, the perigonium free from the ovary, 6-cleft or -parted, corolla-like (rarely 4-8-parted, in which case the outer divisions are calyx-like); stamens as many as divisions of perigonium, inserted on it or on the receptacle; anthers 2-celled, introrse. Ovary 3-celled, with 1-∞ ovules in each cell, implanted on the central angle, anatropous. Fruit an indehiscent berry — Styles 1-3. Fruit 3- (or by abortion 1-2-) celled, with one, globular, angled, or triquetrous seed in each cell. Embryo small, in a cavity of the albumen.

* *Plants with ordinary leaves. Perigonium 6-toothed.*

1. POLYGONATUM. Flowers drooping on slender pedicels, cylindrical, perfect.

* * *Leaves reduced to scales. Plants furnished with sterile, leaf-like branches.*

† *Sterile branches (cladodia) subulate, clustered in axils, rarely solitary.*

2. ASPARAGUS. Flowers small, on short pedicels, axillary, perfect, diœcious or polygamous.

† † *Sterile branches (phyllocladia* or *phyllodia) flattened, resembling leaves of Polygonatum.*

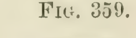
3. RUSCUS. Flowers growing on the midrib of the lower face of the phyllocladium. Perigonium 6-parted.

4. DANÆ. Flowers terminal, racemed. Perigonium gamophyllous.

1. POLYGONATUM, Tourn. SOLOMON'S SEAL.

Flowers perfect. Perigonium white, cylindrical, with six, erect, green teeth. Stamens 6, inserted above the middle of tube, included, the anthers linear, fixed by their back. Ovary sessile, oblong, 3-celled, with 2 ovules in each cell; style filiform, deciduous; stigma dot-like. Berry globular, with globular seeds — Caulescent herbs, arising from thick, knotted root-stocks.

P. polyanthemum, M. B. .3 to .4; stem angled, naked to nearly half its height. Leaves alternate, .04 to .08 long, .015 to .025 broad, oblong-lanceolate, short-petioled, acutish, slightly roughened. Pedicels glabrous, 1-4-flowered, nodding, with flowers one-third to one-fourth as long as leaves; perigonium .01 long, constricted above ovary — June — Amanus and Kurd Dagh.


FIG. 359.



Leaf and raceme of Polygonatum polyanthemum.

2. ASPARAGUS, L. ASPARAGUS. *Halyûn.*

Flowers perfect, diœcious or polygamous. Perigonium campanulate or hemispherical, 6-parted. Stamens 6, free, included, equal, inserted near the base of the divisions, the anthers fixed by their back,

introrse. Ovary 3-celled, with 2-∞ ovules in each cell; style straight, filiform; stigma 3-lobed. Berry succulent, 3-celled, or by abortion 1-celled. Seeds globular or triquetrous — Perennial herbs or branching shrubs. The leaves reduced to scales, often produced into a spur or prickle at base. The sterile branches (cladodia) clustered in the axils, or rarely solitary. Flowers by abortion diœcious or polygamous; rarely hermaphrodite, borne on jointed pedicels.

* *Cladodia clustered.*

1. A. Palæstinus, Baker. ♃ .6 to 1; stem flexuous; branches spreading or reflexed. Leaves not spurred. Cladodia 3-8, *subulate*, .01 to .014 long, slender, pedicels *solitary*, twice as long as flower; perigonium *hemispherical* — Spring — Jordan Valley and around Dead Sea; Jaffa.

2. A. Lownei, Baker. ♃ .6 to 1 or more; stem flexuous; branches spreading or reflexed. Leaves not spurred. Cladodia 4-8, *setaceous*, .015 to .024 long, flaccid. Pedicels *twin*, twice and a half as long as flower; perigonium *funnel-shaped* — Spring — Near Jericho (Lowne). Probably a variety of the last.

3. A. acutifolius, L. ♄ *Halyûn.* .5 to 1, intricately branched, the branches and twigs striate, *velvety*. *Lower leaves spurred at base.* Cladodia 4-12, clustered, divergent, subulate, rigid, *nearly equal*, .003 to .008 long, mucronate. Peduncles 1-2; divisions of perianth *nearly equal;* filaments *about twice* as long as anther; berry black, .005 in diameter — Autumn — Dry places; coast to middle mountain regions. The young shoots are brought to market, and used as food like the cultivated Asparagus.

4. A. aphyllus, L. ♄ .5 to 1, intricately branched, the branches and twigs spreading, *angled*, *scabrous*. Lower leaves *deltoid-spurred*, *at length prickly*. Cladodia 2-6, clustered, unequal, thick, .005 to .01 long, *at length prickly*. Peduncles 1-2, nodding; *inner divisions of perianth shorter*, incurved at tip; filaments *one-third longer* than anther; berry black, .005 in diameter — Autumn — Dry places; coast to middle mountain regions. Too near the last.

* * *Cladodia usually solitary.*

5. A. stipularis, Forsk. ♃ Stems erect, intricately branched, climbing over hedges; branches angled-grooved. *Lower leaves produced at base into short prickles.* Cladodia *thick*, .0015 to .002 in diameter, solitary or 1-2 in a cluster, .01 to .05 long, spreading, *prickly-tipped*. Peduncles 1-2, once and a half as long as flower; divisions of perianth alike; berry a little smaller than a pea—Spring—Coast; Jordan Valley.

Var. **brachyclados**, Boiss. Cladodia .01 or less.

3. RUSCUS, Tourn. Ruscus.

Flowers diœcious. Perigonium greenish, marcescent, 6-parted, the segments at length spreading, the interior narrower, covered in the bud. *Staminate flowers.* Stamens 3, connate into an ovate tubule, at the apex of which are three anthers with divergent cells. *Pistillate flowers.* Filaments connate in a tubule surrounding the pistil, destitute of anthers. Ovary sessile, 3-celled, with 2 ovules in each cell; style short,

stigma capitate. Berry fleshy, generally 1-celled, 1-seeded. Seed nearly globular — Erect shrubs, with minute, bract-like, scarious leaves and branches (*phyllocladia* or *phyllodia*) transmuted into leathery, persistent, veined, sessile, leaf-like bodies, horizontal, owing to a twist of the base. Flowers small, springing from the midrib of the lower surface of the phyllocladium.

1. R. aculeatus, L. ♄ Butcher's Broom. Knee-Holly. *Rabababâth.* .5 to 1; branches ascending. Phyllodia ovate-lanceolate, .01 to .025 long, *tapering into a spiny tip.* Flowers 1-2, short-pedicelled, inserted below the middle of the phyllodium, subtended by a *firm bract* from the midrib; berry .01 in diameter — Spring — Rocky places; coast to middle mountain zone.

4. DANÆ. Medic. DANÆ.

Flowers perfect. Perigonium fleshy, urn-shaped, with small, deltoid, equal teeth. Filaments 6, connate into a tube arising above the middle of the perigonium; anthers 6, contiguous, exserted from the throat of the tube. Ovary sessile, imperfectly 3-celled, with 2-ovules in each cell; style short; stigma capitate. Berry globular, 1-celled, usually ∞-seeded — An erect shrub, similar to Ruscus, but with flowers in terminal racemes, and a gamophyllous perigonium.

D. racemosa, L. ♄ Erect, much branched. Phyllodia obliquely oblong-lanceolate, acuminate. Raceme from axil of upper phyllodium, 6-9-flowered; pedicels somewhat shorter than flower, jointed at tip; berry large — Spring — In oak groves, Amanus, 1000 m.

ORDER CXII. LILIACEÆ, D. C. (LILY FAMILY).

Herbs, often bulbous, or woody plants, with regular, symmetrical, 6-*merous, or* 6-*fid,* 6-*androus flowers, the stamens opposite the divisions or lobes of the perigonium, with* 2-*celled, versatile or introrse anthers, the ovary* 3-*celled, styles coalesced into* 1, *stigmas* 1-3, *the fruit a* 3-*celled capsule, loculicidally dehiscent, few-∞-seeded, the seeds albuminous* — Stamens hypogynous or inserted at bases of divisions of perigonium. Ovary free, or adherent below. Ovules in 2 rows, inserted at inner angle.

TRIBE I. **ALOINEÆ.** (ALOES TRIBE). Herbs, or shrubs, or small trees, with fleshy leaves. Perigonium united.

1. ALOE. The very succulent leaves rosetted at tip of root.

TRIBE II. **ASPHODELEÆ.** (ASPHODEL TRIBE.) Root consisting of clustered, fleshy tubers, or more or less slender fibres, or a root-stock. Divisions of perigonium urceolate, connate at base or free.

2. ASPHODELUS. Scape leafless, simple or forked. Flowers white or cream-colored. Anthers equal

3. ASPHODELINE. Scape usually more or less leafy. Flowers yellow or white. Inner anthers much larger than outer.

4 EREMURUS. Stem leafless. Leaves strap-shaped. Flowers (in ours) funnel-shaped, .01 long, yellowish. Anthers equal.

TRIBE III. **ALLIEÆ.** (ONION TRIBE.) Bulbous plants with scapes. Divisions of perigonium free. Style arising from base of ovary, received into its central tube, then free. Seeds globular or angled.

5. ALLIUM. Perennial herbs with alliaceous odor and umbelled flowers.

TRIBE IV. **SCILLEÆ.** (SQUILL TRIBE). Bulbous plants, with a raceme or spike of flowers borne on a simple, leafless scape. Bracts under each flower herbaceous or scarious, never forming an involucre.

6. DIPCADI. Perigonium tubular-funnel-shaped, the outer lobes falcate. Ovules numerous in each cell, flattened.

7. URGINEA. Perigonium spreading, of distinct divisions. Ovules numerous in each cell, flattened.

8. MUSCARI. Perigonium more or less constricted below mouth. Seeds 2 in each cell, not caruncled.

9. HYACINTHUS. Perigonium not constricted. Seeds 6-8 in each cell, furnished with a tumid caruncle.

10. BELLEVALIA. Perigonium not constricted. Seeds two in each cell, not caruncled.

11. PUSCHKINIA. Perigonium nearly 6-parted, furnished with a 6-cleft crown. Flowers blue.

12. SCILLA. Perigonium nearly 6-parted, destitute of crown. Flowers lilac, purple, pink, or blue.

13. ORNITHOGALUM. Perigonium nearly 6-parted, destitute of crown. Flowers white, rarely cream-colored, or tawny, divisions green-banded.

TRIBE V. **LILIEÆ.** (LILY TRIBE.) Bulbous, caulescent plants. Divisions of perigonium free. Style terminal. Seeds (except in Gagea) compressed, discoid.

14. LILIUM. Perigonium funnel-shaped, (in ours) white. Divisions with a nectariferous groove at claw.

15. FRITILLARIA. Perigonium campanulate, divisions with a nectariferous pore at base.

16. TULIPA. Perigonium campanulate, divisions often with a spot at base, but no pore.

17. GAGEA. Perigonium funnel-shaped, divisions yellow, or green with yellow margins. Nectary 0.

18. LLOYDIA. Perigonium funnel-shaped, divisions (in ours) greenish-white, with pink tips. Nectary (in ours) 0.

TRIBE VI. **COLCHICEÆ.** (COLCHICUM TRIBE). Cormous or rhizomatous, stemless plants. Perigonium 6-cleft or -parted. Styles free or more or less united.

19. COLCHICUM. Perigonium with a long tube, 6-cleft, without nectary at base of divisions.

20. MERENDERA. Perigonium destitute of tube, 6-parted, the lamina grooved below to receive the filament.

21. ERYTHROSTICTUS. Perigonium destitute of tube, 6-parted, with 1-2, nectariferous points at insertion of filament

1. ALOE, L. ALOE. Sobr.

Perigonium tubular, cylindrical, straight or somewhat curved, regular, nectariferous at bottom, 6-cleft into elongated lobes. Stamens 6, hypogynous, erect, adherent to base of perigonium. Anthers introrse, fastened at back, above base. Ovary sessile, 3-celled, with numerous ovules in each cell. Style slender, stigma simple. Capsule 3-celled,

loculicidally 3-valved. Seeds flattened, winged at angles — Stemless or caulescent plants, or shrubs, with rosettes of very fleshy leaves.

A. vera, L. ♃ Stem short, thick, somewhat divided. Leaves sessile, crowded, lanceolate, erect-spreading, rather concave, spiny-toothed at margin. Scape longer than leaves, scaly, branched; racemes long, dense; bracts short-lanceolate, membranous, longer than the short pedicel; flowers pendulous, imbricated, yellow; anthers somewhat exserted — Summer — Syrian coast. Commonly planted in cemeteries.

2. ASPHODELUS, L. Asphodel.

Perigonium spreading, regular, with equal, 1-nerved divisions, connate at base. Filaments dilated at base, concave, surrounding the ovary, then filiform, ascending; anthers equal, fixed by the middle of their back. Ovary 3-celled, with 2 ovules in each cell; style filiform; stigma capitate-3-lobed. Capsule leathery, loculicidally 3-valved. Seeds acutely triquetrous, transversely grooved at back — Herbs, with roots consisting of clustered tubers or slender fibres, and a leafless scape, with panicled or racemed flowers, the pedicels jointed above or near their middle.

* *Leaves not fistulous, flattened triquetrous. Roots tuberous and gibbous, perennial.*

1. A. microcarpus, Viv. ♃ *Thuwai. 'Ansal.* Tubers spindle-shaped, .1 to .2 long, .01 to .02 thick; neck surrounded by bristly fibres. Leaves sword-shaped, .5 to 1 long, .01 to .02 broad, tapering at tip. Scape 1 or more, terete, *solid;* racemes dense, spreading, panicled; pedicels erect, shorter than flowers; perigonium .02 broad, white, funnel-shaped, divisions oblong, obtuse, with a reddish or greenish keel; capsule obovate, .008 long — February to April — Waste hillsides; common from coast to middle mountain zones and interior plains; Ghor-es-Sâfieh.

* * *Leaves fistulous. Roots fibrous, monocarpic or perennial.*

2. A. fistulosus, L. ② ♃ .3 to 1. Leaves narrowly linear, semiterete, keeled at lower surface, with roughish margins, tapering-subulate, shorter than scape. Scape dichotomously branched; bracts lanceolate, acuminate; pedicels jointed *about middle;* flowers white or flesh-colored, *rotate,* divisions .01 to .025 long, with a greenish or purple stripe; capsule .005 in diameter — Spring — Fields and roadsides; common from coast to middle mountain zones and interior plains.

3. A. tenuifolius, Car. ♃ *Barwaq.* .2 to .5 or more. Leaves narrowly linear, semiterete, tapering-subulate, shorter than scape, *with rougher margins* than in last. Scape simple or dichotomously branched; bracts triangular at base, acuminate; pedicels jointed below middle; flowers white, *campanulate,* divisions .013 long, with a purple stripe; capsule .003 in diameter.

Var. **micranthus,** Boiss. Capsules and flowers a little smaller — Southern Deserts; coast of southern Palestine.

4. A. viscidulus, Boiss. ♃ .2 to .25. Leaves subulate-linear, *viscid, glabrous.* Scapes 3-4, *ascending outside of rosettes of leaves,* simple, the naked portion shorter than leaves, raceme *few-flowered;*

bracts triangular, *mucronate*, one-half to one-third as long as pedicel; *pedicels jointed near base;* flowers white, divisions .005 to .006 long, with a purple stripe; capsule .002 to .003 in diameter — Spring — Deserts of Sinai and et-Tîh.

3. ASPHODELINE, Rchb. Asphodeline.

Perigonium spreading, with six, 1-nerved divisions, connate into a short, urn-shaped base, the lowest a little distant from the others, narrower, and more tapering at base. Filaments dilated at base, concave, surrounding the ovary, then filiform, declined-ascending, the outer usually much shorter. Anthers of inner stamens larger, linear-elliptical, fastened by the middle of their back; anthers of outer stamens ovate, minute, (sterile ?). Ovary 3-celled, with 2 ovules in each cell; style filiform; stigma somewhat capitate. Capsule coriaceous. Seeds acutely triquetrous, transversely grooved at back — Herbs, with clustered, cylindrical root-fibres, the stem more or less leafy, ending in a raceme or panicle, the pedicels jointed.

* *Perigonium yellow. Perennials.*

1. A. lutea, L. ♃ 1 or more; root-fibres long; stem *stout, leafy along its whole length*, ending in a *simple, dense, spiked raceme*, .1 to .15 long in flower, .3 to .5 in fruit. Leaves stiff, subulate, triquetrous, sheathing at base, the upper much shorter. Bracts *large*, ovate, cuspidate, longer than pedicels; divisions of perigonium .02 long, midrib green; capsule oblong-globular, .014 long — Summer — Rocky places; middle to subalpine and alpine mountain zones, and interior plains.

2. A. brevicaulis, Bert. ♃ .4 to .5; root-fibres cylindrical, .003 to .006 thick; stem *slender*, ascending, leafy for half to two-thirds of its height. Leaves linear-subulate, triquetrous, scabrous-margined. Racemes rather *loose, rarely simple, usually loosely panicled;* bracts *small*, deltoid-cuspidate; pedicels solitary or twin, stiff, jointed below middle; divisions of perigonium .015 to .02 long, midrib green; capsule globular, .015 in diameter — April to June — Shady places and hillsides; middle mountain zones, and interior plains.

* * *Perigonium white. Biennials.*

† *Stem leafy for its whole length.*

3. A. Taurica, Pall. ② *'aṭ-'âṭ. Abu-'amir.* .6 to 1; root-stock short, often oblique, with slender, cylindrical fibres; stem stout, ending in a spike-like raceme, .1 to .2 long. Leaves stiff, linear-tapering, scabridulous at margin, sheathing at base. Bracts silvery white, longer than flowers, ovate to oblong, acute to cuspidate; pedicels stiff, short, jointed at middle, 2-3 together below; divisions of perigonium linear-spathulate, brown-striped; capsule ovoid, .008 long — Summer — Subalpine to alpine Lebanon and Antilebanon; mountains of Moab; Hems.

† † *Lower third of stem leafy. Divisions of perigonium .02 long.*

4. A. globifera, J. Gay. ② .5 to 1; root-stock short, with cylindrical fibres; stem stout, ending in a single, dense raceme, .1 to .2 long. Leaves linear-subulate, triquetrous, somewhat rough, erect, crowded. Bracts scarious, as long as pedicels or longer, the midrib

brownish; pedicels longer than capsules, stiff, jointed at middle, the lower clustered; divisions of perigonium oblanceolate, capsule obovate, .007 to .01 long — Summer — Cassius and Amanus to Aintâb, and Marash.

† † † *Stem leafless, or leafy only toward base.*

5. A. Damascena, Boiss. ② 1 or more; root-stock short, thick, with fine fibres; stem stout, ending in a spiked raceme, .3 to .4 long, rarely branched. Leaves near the root, crowded, linear-triquetrous, subulate-acuminate, *margins scarcely rough.* Bracts silvery, lanceolate, acuminate, longer than pedicels; pedicels clustered, *jointed above middle*, half as long as flower, becoming elongated to twice or thrice the length of capsule; divisions of perigonium linear-oblong, with dark midrib; capsule obovate-triquetrous, .01 long — April to June — Middle to subalpine zones of mountains east of Jordan; Antilebanon; Damascus plateau to Aintâb, and northward.

6. A. recurva, Post. ② (Bull. Herb. Boissier, Vol. III. p. 166). .3; leaves *all* radical, not dense, linear, *overtopping base of raceme*, strongly nerved, margins *smooth*, or scarcely roughened, *base scarious-dilated.* Stem wavy, ending in a loose, simple or 1-branched raceme; bracts deltoid at base, suddenly contracted into a cusp, subulate, half as long as flowering pedicels; pedicels *solitary*, jointed above middle, spreading in flower, *recurved and twice to thrice as long as capsules in fruit;* divisions of perigonium linear, white with a green midrib; capsule *obovate-turbinate*, .008 long — May to September — Between Irbid and Buṣrah (Ḥaurân); near Antioch.

4. EREMURUS, M. B. Eremurus.

Perigonium funnel-shaped, tubular-campanulate or rotate, the 6 divisions more or less connate at base into a short urn, sometimes somewhat irregular. Filaments 6, hypogynous, induplicate or straight in bud. Anthers fixed above base, often incurved, all alike. Ovary 3-celled, with 2-4 ovules in each cell; style filiform, often declined; stigma dot-like. Capsule membranous-leathery, loculicidally 3-valved. Seeds acutely triquetrous, with winged angles — Herbs, with root-stocks and clustered root-fibres, strap-shaped root-leaves, naked stems, and a simple raceme of small, yellowish, funnel-shaped flowers.

E. spectabilis, M. B. ♃ .8 to 1; neck fibrous. Leaves appearing with flowers, half as long as stem, .3 to .4 long, .01 to .015 broad. Raceme .1 to .2 long; bracts lanceolate, long-tapering, ciliate, longer than pedicels; pedicels not jointed, erect in flower, about twice as long as perigonium, in fruit thickened, stiff, curved upward; divisions of perigonium, linear-oblong, at length convolute, .01 long, filaments twice as long as perigonium; capsule globular, one-half to one-third as long as pedicel — April and May—Subalpine Lebanon and Antilebanon.

5. ALLIUM, L. Onion. *Baṣal.*

Perigonium 6-cleft, campanulate or spreading, the divisions 1-nerved, connate at base or distinct. Stamens more or less coherent to base of sepals, and often connate with one another at base. Anthers fixed by the middle of their dorsal surface. Ovary free, sessile, 3-celled,

or owing to incompleteness of septa, 1-celled. Ovules 2-3-6 in each cell, campylotropous. Style filiform, straight. Stigma simple or capitate. Capsule membranous or parchment-like, 3-celled or by abortion 1-celled. Seeds angled, implanted at the central angle of the cell above its base — Herbs with bulbs covered with tunics, a naked scape more or less sheathed by the leaves which spring from the bulb, flowers in a terminal umbel, the buds enclosed in a membranous spathe, at first undivided, then splitting into several valves.

* *Ovules 2, side by side in each cell.*

† *Bulbs not arising from root-stocks. The inner three filaments tricuspid, the cusps filiform or setaceous, the lateral sterile, the intermediate fertile, i.e., anther-bearing.*

‡ *Outer tunics of bulb not separated into fibres.*

§ *Leaves flat, not hollow.*

1 A. scorodoprasum, 2 ampeloprasum, 3 rotundum.

§ § *Leaves hollow.*

4 A. phanerantherum, 5 vineale, 6 sphærocephalum, 7 descendens, 8 Makmelianum.

‡ ‡ *Outer tunics of bulb at length separated into fibres.*

§ *Leaves flat, not hollow.*

9 A. calyptratum, 10 Cilicicum.

§ § *Leaves hollow.*

11 A. Sinaiticum, 12 Hierochuntinum, 13 curtum, 14 Karyeteini.

† † *Bulbs having a root-stock. Filaments all simple or the inner three rarely furnished with a toothlet at base.*

‡ *Leaves hollow.*

15 A. Cepa, 16 Ascalonicum, 17 Schergianum.

‡ ‡ *Leaves not hollow.*

§ *Lower part of scape sheathed with semiterete leaves. Valves of spathe lanceolate, caudate, one at least usually longer than umbel.*

¶ *Tunics of bulb not separating into fibres.*

† *Filaments a little longer than perigonium.*

18 A. stamineum.

† † *Filaments shorter than perigonium or of equal length.*

19 A. paniculatum, 20 chloranthum, 21 modestum, 22 montanum.

¶ ¶ *Outer tunics of bulb at length separated into fibres.*

23 A. Sindjarense, 24 desertorum.

§ § *Base (and sometimes the whole) of scape sheathed with flat leaves. Divisions of perigonium more or less spreading. Spathe broad, short-caudate. Tunics of bulbs never fibrous or reticulate.*

25 A. Libani, 26 Erdelii, 27 subhirsutum, 28 trifoliatum, 29 hirsutum, 30 papillare, 31 Cassium, 32 Zebedanense, 33 Carmeli, 34 Neapolitanum.

** *Ovules* 3-10, *in two rows in each cell.*

35 A. Schuberti, 36 nigrum, 37 stenopetalum, 38 Orientale, 39 Aschersonianum, 40 Rothii, 41 Noëanum, 42 lachnophyllum.

1. A. scorodoprasum, L. ♃ Bulb ovate, bearing smaller bulbs, tunics membranous; scape tall, leafy to middle. Valves of spathe ovate, abruptly acuminate, shorter than umbel; bulbs of umbel violet, crowded; *pedicels few, short;* perigonium purple, divisions ovate-lanceolate, *acute,* with a roughened keel; filaments shorter than perigonium, the fertile cusp of the inner three one-third as long as filament, the sterile twice as long — Summer.

Var. **caudatum,** Bl. Spathe long-caudate, longer than the umbel, *which is generally altogether bulbiferous* — Cedars of Hadeth.

2. A. ampeloprasum, L. ♃ *Busul-el-'Afrit.* 1 or more; bulb ovate, tunics scarious; scape *stout,* leafy to middle. Umbel *many-flowered,* pedicels *many times as long as flowers;* perigonium pink to purple, divisions ovate-oblong, *obtuse;* the back more or less scabrous; filaments a little longer than perigonium, the fertile cusp of the inner three shorter than the sterile — May to July — Fields and dry places; common to subalpine regions, and interior plains.

3. A. rotundum, L. ♃ .3 to .5; bulb generally bearing stipitate bulblets; tunics membranous. Scape leafy for one-third to one-half its height; spathe ovate, mucronate, shorter than umbel, soon deciduous; umbel *globular,* many-flowered, dense, *with unequal pedicels,* the lower very short, *the upper half as long as flower to twice as long;* perigonium pink, *ovate-pyramidal,* scabrous at back or only along keel, divisions ovate-oblong, obtuse or mucronulate; filaments included, the fertile cusp of the inner three much shorter than the sterile; capsule shorter than perigonium — April to August — Fields; common to subalpine regions.

4. A. phanerantherum, Boiss. et Haussk. ♃ .6 to .8; tunics of bulb membranous. Scape leafy to about its middle; spathe soon torn; umbel globular, .02 to .03 broad, with somewhat unequal pedicels, *twice to thrice as long as flower;* perigonium umbilicate at base, *oblong-tubular, somewhat leathery, glossy,* divisions .005 long, elongated-oblong, obtuse, *greenish-yellow,* sometimes reddish at tip, keeled, smooth; filaments *long-exserted,* the fertile cusp of the inner three shorter than filament, the sterile longer; anthers yellow or reddish-brown, linear-oblong, .002 long; ovary oblong; style red, long-exserted — Summer — Middle zone of Lebanon, near 'Aleih; Ṣof Dagh.

5. A. vineale, L. ♃ .5 to 1; bulb ovate, tunics membranous, easily separated at base. Scape leafy to or above middle; spathe ovate, abruptly narrowed, soon deciduous, longer than umbel; umbel bulb-bearing, pedicels erect, four to five times as long as flower; perigonium pale pink, divisions lanceolate, acutish, keeled, smooth; filaments longer than perigonium, the fertile cusp of the inner three shorter than its filament; the sterile much longer — Summer — Fields — Ḥaṣrûn (Lebanon).

Var. **virens,** Boiss. Spathe somewhat longer; flowers reddish-green — Wadi-es-Ṣifṣâf (Northern Lebanon).

6. A. sphærocephalum, L. ♃ .6 to .8; bulb usually having bulblets, and membranous tunics. Scape leafy to middle; spathe at length lobed; umbel globular the outer pedicels as long as flower, the inner longer; perigonium purple to pink, ovate-campanulate, divisions ovate-oblong, obtuse, smooth or roughish along keel; the fertile cusp of the inner three filaments as long as the sterile or longer — Summer — Middle to subalpine mountain zones.

Var. **virido-albidum,** Tineo. Flowers whitish.

7. A. descendens, Fl. Græc. ♃ .6 to .8; bulb not having bulblets, tunics striate. Scape leafy to middle; spathe ovate, cuspidate, shorter than umbel; umbel globular, at *length having the outer pedicels deflexed, and bearing sterile flowers, the central at length elongated, erect;* perigonium purple, narrow-campanulate, divisions connivent, oblong-linear, obtuse, smooth, the outer keeled; filaments all exserted, the fertile cusp of the inner three shorter than the sterile — Summer — Vineyards and hillsides; coast to middle mountain zones.

8. A. Makmelianum, Post. ♃ (Plantæ Postianæ, III., 18.) .1 to .15; tunics of bulb membranous, the outer blackish. Scape terete, leafy to above middle, shorter than leaves; spathe soon torn, ovate, abruptly cuspidate, shorter than umbel; umbel globular, .015 to .025 across, pedicels unequal, shorter than flower, or about as long; perigonium umbilicate at base, ovate, somewhat coriaceous, divisions ovate, *whitish with a red midrib* and scarious margin, *minutely denticulate,* long mucronate; fertile cusp of inner filaments included, one-fifth as long as filament, one-third as long as sterile cusps, the latter as long as perigonium; anthers reddish-brown; ovary globular, style included — July — Near snow-line, Rijâl-el-'Asherah (Northern Lebanon) 2800 m.

9. A. calyptratum, Boiss. ♃ .3 to .5; tunics of bulb brownish, produced into elongated, loose sheaths. Scape leafy to its lower third or middle, longer than linear leaves; spathe membranous, red, *hood-shaped, abruptly narrowed into a cusp longer than itself, at length cut around and torn, deciduous;* spathels white, torn at the base of pedicels; umbel loose, 10-15-flowered, pedicels unequal, once and a half as long as flowers; perigonium *white,* short-campanulate, divisions ovate-oblong, obtuse, with a greenish, somewhat roughish keel, ending in a mucro; filaments dilated, glabrous, the fertile cusp of the inner three somewhat exserted, the sterile thrice as long — June — Alpine regions of Mt. Cassius.

10. A. Cilicicum, Boiss. ♃ .2 to .4; bulb small, .01 long, tunics produced along base. Scape slender, leafy to middle, leaves narrowly linear, .002 broad; *spathe very short, soon splitting into linear divisions;* umbel small, .01 to .025 in diameter, with slightly unequal pedicels as long as flower or a little longer; perigonium oblong-campanulate, *purple,* divisions keeled, *the keels of the outer, oblong, acutish ones warty;* fertile cusp of the inner three filaments half as long as the subexserted sterile ones — June — Jebel-ed-Durûz (Ḥaurân); middle to subalpine and alpine zones of Antilebanon, Amanus, Aintâb, and Akher Dagh, and northward.

11. A. Sinaiticum, Boiss. ♃ *Buttait.* .1 to .2; bulb ovate-conical, .02 long, *tunics reticulate*, slightly produced above base of scape. Scape ascending, *two-leaved* at about middle, *half as long* as terete, tapering leaves; spathe membranous, ovate, many-nerved, abruptly short-mucronate, about as long as pedicels, soon torn; umbel 5-10-flowered, pedicels ascending, twice to twice and a half as long as flowers; perigonium campanulate, divisions oblong, rather obtuse, *white except the pale red keel, scabridulous;* filaments dilated, ciliate below, the cusps of the inner three half as long as their filament, *the fertile scarcely shorter than the sterile* — March — Deserts around the Dead Sea, and southward to Sinai.

12. A. Hierochuntinum, Boiss. ♃ .2 to .5; bulb ovate-oblong, .01 to .03 long, tunics somewhat reticulate. Scape ascending, leafy to or below middle, leaves filiform, *as long as scape or shorter*, spathe 2-leaved, much shorter than umbel, leaves ovate-triangular; umbel globular, .01 to .03 in diameter, the outer pedicels very short, the inner somewhat longer than flower; perigonium *blue*, cylindrical-campanulate, divisions lanceolate, acute, the outer with a scabrous keel; filaments two-thirds as long as perigonium, glabrous, *the fertile cusp of the inner three very short, half as long as the sterile* — Around Dead Sea to the level of the Mediterranean; Ḥaurân; Syrian Desert.

13. A. curtum, Boiss. et Gaill. ♃ .07; bulb small, *spherical*, with bulblets, and membranous tunics. Scape thick, *about 3-leaved below*, shorter than half-terete, .002 broad leaves; spathe membranous, valves 2-3, ovate, deflexed, very short; umbel *globular-ovate*, the lower pedicels very short, the upper at length twice to thrice as long as flowers; perigonium small, ovate, hemispherical-campanulate, divisions ovate, obtuse, smooth, *greenish-red with white margins;* filaments somewhat exserted, the inner three lanceolate, ciliate, the fertile cusp thicker than the sterile, and a little shorter — May — Sandy places; coast to hill country of Palestine and Judean Wilderness.

14. A. Karyeteini, Post. ♃ 1; bulb oblong, .02 to .03 long, *the dense fibrous tunics somewhat reticulate, and prolonged* .1 *upward on the scape.* Scape terete, rather slender, leafy to middle; leaves * * ; spathe membranous, valves 2-3, one-third to one-half as long as umbel; umbel many-flowered, pedicels *very slender;* flowers .002 long, one-half to one-fourth as long as pedicels; perigonium campanulate, divisions oblong, obtuse, reddish with white scarious margins, obtusely keeled, smooth — July — Ravines of mountains south of Qaryetein, in the Syrian Desert.

15. A. Cepa, L. Onion. *Buṣul.* ♃ Bulb thick, globular, tunics membranous. Scape tall, hollow, inflated and leafy near base, leaves in two rows, shorter than scape; umbel globular, many-flowered; pedicels 4-5 times as long as flowers; spathe composed of 2-3, reflexed valves; perigonium white, divisions ovate-oblong, acutish; filaments longer than perigonium, connate with each other and the perigonium at its base, and dilated, the outer toothless, the inner with a triangular, obtuse tooth on either side at base — June — Cultivated everywhere.

16. A. Ascalonicum, L. Shallot. ♃ Bulb ovate-oblong, tunics membranous, entire. Scape hollow, longer than leaves; spathe membranous, bivalved, shorter than umbel; umbel globular, pedicels

scarcely longer than flower; perigonium *white or bluish*, divisions oblong-lanceolate, acute; filaments free, as long as perigonium, the outer simple, subulate, the inner dilated and with a short tooth on either side at base — Summer — Cultivated everywhere; said to be a native of Palestine and Syria.

17. A. Schergianum, Boiss. ♃ .3 to .4; bulb .01 to .015 long, ovate, tunics membranous. Scape leafy for one-third its height, somewhat shorter than leaves; spathe composed of 2, ovate, cuspidate lobes, shorter than umbel; umbel globular, *many-flowered*, *dense*, pedicels *capillary*, as long as flowers to twice as long; perigonium *cream-colored*, narrow-campanulate, divisions linear, rather obtuse, smooth, the outer somewhat keeled; filaments white, subulate from base, somewhat longer than perigonium; capsule globular-triquetrous, somewhat longer than perigonium — May — Hermon to Deir 'Aṭîyeh (Antilebanon plateau).

18. A. stamineum, Boiss. ♃ .1 to .5; bulb ovate, .01 to .015 long, outer tunics thickish, striped. Scape terete, flexuous, leafy to a third of its height, leaves very narrowly linear, about as long as scape; spathe composed of two, *ovate to lanceolate or linear*, *subulate-tapering valves*, *usually several times longer than umbel*, sometimes only a little longer, ; umbel many-flowered, spreading, pedicels slender, unequal, twice to several times as long as flower; perigonium *hemispherical-campanulate*, *pink to whitish*, divisions oblong-ovate, obtuse or rarely acutish, sometimes apiculate; filaments adnate at base, once and a half as long as perigonium, subulate toward tip; anthers yellow; capsule globular-triquetrous — April to June — Hillsides; coast to alpine mountain zones and interior plains; summit of Jebel Katarina (Sinai); El-Ghôr.

Var. **Hymettium,** Boiss. Umbel smaller, pedicels shorter, more nearly equal — Beirût; Jebel Qasyûn (Damascus).

Var. **alpinum,** Post. Umbel small, .015 to .02 broad; valves broad-ovate at base, one about as long as umbel, the other a little longer; flowers minute — Top of Jebel Kenîseh (Lebanon).

19. A. paniculatum, L. ♃ .5 to 1; bulb ovate, the outer tunics membranous or parchment-like. Scape terete, stout, leafy above middle; leaves narrowly linear, solid or hollow; valves of spathe 2, oblong-elliptical at base, tapering into a tail as long to several times as long as umbel; umbel *very numerous-flowered*, with very unequal pedicels, nodding before flowering, several to many times as long as perigonium; perigonium *greenish-white* to flesh-colored and pink, obconical-campanulate, divisions connivent, oblong-linear, obtuse, sometimes apiculate; filaments subulate, connate with each other and with the perigonium at base, the sinuses without teeth, or rarely with a minute tooth; capsule *ellipsoid*, tapering at base; style exserted — Summer — Fields; coast to middle mountain zone and interior plains.

Var. **pallens,** Boiss. Umbel contracted, more globular, pedicels shorter, more nearly equal. Flowers usually white — Common.

20. A. chloranthum, Boiss. ♃ .3 to .5; bulb ovate, .01 to .025 long, outer tunics turning black, inner membranous. Scape flexuous, leafy beyond middle; leaves nearly cylindrical, hollow, about as long as scape; valves of spathe 2, oblong at base, caudate-

acuminate, one or both usually much longer than umbel; umbel many-flowered, pedicels unequal, twice to four times as long as flower; perigonium *yellowish-green*, obconical-campanulate, .005 to .008 long, divisions oblong, obtuse; filaments lanceolate at base, subulate at tip, adnate at base to perigonium and about as long as its divisions; anthers yellow, somewhat exserted; capsule *ovate*, tapering at base, *vesicular-tubercled* — June — Upper zones of Cassius; Kurd Dagh; about Aintâb.

21. A. modestum, Boiss. ♃ .12 to .2; bulb ovate with membranous tunics. Scape terete, leafy to near middle, leaves semiterete, as long as scape or longer; valves of spathe 2, somewhat dilated at base, linear, usually shorter than umbel; umbel many-flowered, pedicels capillary, spreading or recurved, .02 to .025 long, thrice to four times as long as flower; perigonium *dirty whitish-green with a reddish tinge, cylindrical*, .008 to .01 long, divisions *oblong-linear, tapering at tip*, acutish or obtuse; filaments lanceolate, adnate to base of perigonium, *half its length;* ovary oblong, style included — Spring — Borders of et-Tîh near Gaza.

22. A. montanum, Sibth. et Sm. ♃ .15 to .2; bulb oblong, outer tunics black, striate. Scape flexuous or ascending, leaves 1-2 below, somewhat terete-filiform, shorter than scape; valves of spathe 2, lanceolate-subulate, as long as umbel or longer; pedicels unequal, 5-12, the longest once and a half to twice as long as flower; perigonium *pinkish-purple*, .003 to .004 long, campanulate, divisions *oblong-spathulate*, obtuse; filaments lanceolate-subulate, adnate to base of perigonium; ovary obovate, stigma somewhat exserted — September — Akher Dagh, and northward.

23. A. Sindjarense, Boiss. et Haussk. ♃ .1 to .3; bulb ovate-oblong, .01 to .02 long, *densely clothed with* tawny, netted *fibres.* Scape erect, stiff, leafy below; leaves filiform, semiterete, *much shorter* than scape; spathe membranous, valves 2, *ovate-lanceolate, long-caudate*, reflexed, *shorter* than umbel; umbel spreading, pedicels purple, unequal, 6-25, the longest 4-5 times as long as flower; perigonium deep purple, campanulate, .004 long, divisions oblong-lanceolate, acuminate, rather obtuse; filaments three quarters as long as perigonium, dilated at base, connate, tapering, the alternate ones narrower — May — Sowarat-el-Kebîri at the border of the Leja; Palmyra, and eastward.

24. A. desertorum, Forsk. ♃ .15 to .3; bulb oblong, .1 to .3 long, *the outer tunics thick, the inner netted-striate*, at length divided into fibres. Scape striate, nodding at tip before flowering, somewhat flexuous, with three leaves or less at base; leaves slender, grooved, striate, *longer* than scape; valves of spathe membranous, red-nerved, *oblong-ovate, suddenly contracted into a subulate cusp, longer* than umbel; umbel 5-20-flowered, pedicels diffuse, unequal, once and a half to thrice as long as flowers; perigonium campanulate, .005 long, divisions oblong-lanceolate, *white, glossy, red-keeled*, acutish, somewhat recurved at tip; filaments simple, three quarters as long as perigonium, dilated at base, subulate at tip; anthers yellow; style included; stigma capitate — May — Deserts bordering on Egypt.

25. A. Libani, Boiss. ♃ .1; bulb ovate, .015 to .02 long, outer tunics blackish-grey. Scape thickish, leafy at base or even to tip; leaves 3-4, spreading, *lanceolate, incurved, and often wavy*, longer than scape;

spathe as long as pedicels, 2-3-lobed; umbel *dense*, hemispherical; pedicels as long as flower to once and a half as long; perigonium campanulate, .006 to .008 long, whitish-straw-colored, divisions connate below, lanceolate, acute; filaments half as long as perigonium, connate below, broad triangular-lanceolate, acute; style longer than stamens, slightly thickened at tip — April — Middle mountain regions from southern Palestine at ed-Doheriyeh to alpine summits of Lebanon and Antilebanon.

26. A. Erdelii, Zucc. ♃ .2 to .5; bulb ovate-oblong, .01 to .015 long, the outer tunics leathery. Scape terete, leafy only at base; leaves linear, *folded*, subulate-tapering, usually ciliate at margin; spathe tapering, at length 3-4-lobed, somewhat shorter than pedicels; umbel dense, hemispherical; pedicels as long as flower to once and a half as long, at length elongated; perigonium campanulate, .008 to .01 long, straw-colored, glossy, divisions connate near base, oblong-lanceolate, acute; filaments as long as perigonium, connate and dilated at base, tapering-subulate; style longer than stamens, somewhat capitate at base — April to June — Coast near Gaza; Hebron; Moab, Gilead and Ḥaurân; el-Jebel-el-Aḥmar (Amanus).

27. A. subhirsutum, L. ♃ .2 to .5; bulb globular, with white tunics. Scape slender, the lower part leafy; leaves linear, flat, tapering, *more or less ciliate-hairy* or glabrescent, usually shorter than scape; spathe ovate-tapering, 2-3-valved, *half* as long as pedicels; umbel spreading, many-flowered, pedicels once and a half to four times as long as flower; perigonium .008 long, *white*, divisions spreading, oblong, *obtuse*; filaments two-thirds as long as perigonium, triangular-lanceolate at base, abruptly subulate-tapering, connate; style somewhat longer than stamens, filiform — Spring — Coast of Palestine and southern Syria to middle mountain zone; Meksi (border of Cœlesyria); Khan Murâd (Lebanon).

28. A. trifoliatum, Cyr. ♃ .2 to .4; bulb globular. Scape leafy below; leaves flaccid, linear, acute, usually longer than scape, *sparingly hairy at face* or glabrescent; spathe bifid, shorter than umbel; umbel many-flowered, pedicels 2-3 times as long as flowers; perigonium .008 long, divisions *white with pinkish keel, or pink throughout*; filaments half as long as perigonium, lanceolate at base, tapering-subulate; style longer than stamens — Spring — Hills and fields of maritime plain to middle mountain zones; Ḥaurân.

29. A. hirsutum, Zucc. ♃ .3 to .4; bulb ovate to globular. Scape leafy below; leaves 3-5, linear, flat, as long as scape, *the sheaths and blades densely beset with retrorse hairs ;* spathe shorter than pedicels, bifid into ovate-lanceolate lobes; umbel many-flowered, loose, pedicels 3-4 times as long as flowers; perigonium .008 long, white, divisions oblong-lanceolate, *acute ;* filaments half as long as perigonium, lanceolate, connate at base, tapering; style longer than stamens — Spring — Rocky places; coast and hill country of southern Palestine; Marash.

30. A. papillare, Boiss. ♃ .2 to .3; bulb ovate, with rusty-colored tunics. Scape thickish, *ascending*, the lower part leafy; leaves scarcely shorter than scape, narrowly linear, folded, subulate-tapering, *beset especially at sheaths with appressed, retrorse, club-shaped papillæ ;* spathe with ovate, *cuspidate* lobes, as long as pedicels; umbel hemispherical, pedicels twice as long as flowers; perigonium white, .006

long, divisions ovate, obtuse; filaments about as long as perigonium, connate, triangular-lanceolate, tapering; style longer than perigonium — Spring — Sandy places and deserts of southern Palestine and et-Tîh.

31. A. Cassium, Boiss. ♃ .2 to .3; bulb ovate, with greyish tunics, *at length densely pitted.* Scape slender, flexuous, leafy below; leaves narrowly linear, puberulent or glabrescent, scarcely shorter than scape; spathe half as long as pedicels, 2-4-lobed; umbel 7-12-flowered, pedicels once and a half to thrice as long as flowers; perigonium white to pale pink, campanulate, divisions oblong-linear, obtuse; filaments half as long as perigonium, connate at base, lanceolate, subulate-tapering at tip; style subulate, longer than filament — May and June — Lebanon at Cedars; Buqa'; top of Mt. Cassius; Akher Dagh.

32. A. Zebadanense, Boiss. et Noë. ♃ .3 to .6; bulb ovate; tunics tawny. Scape leafy below, leaves *lanceolate-linear*, acute, flat, shorter than scape, smooth or roughish at margin; spathe ovate, short-tapering, about as long as pedicels; umbel 6-many-flowered, pedicels scarcely longer than flowers; perigonium white, divisions oblong to elliptical, obtuse; filaments two-thirds as long as perigonium, connate at base, lanceolate gradually tapering; style somewhat longer than anthers — May and June — Subalpine to alpine Lebanon and Amanus.

33. A. Carmeli, Boiss. ♃ .1 to 1.3; bulb ovate, with thickish, white tunics. Scape as thick as a goose quill, smooth, leafy for a quarter of its height; leaves linear, elongated, .01 to .015 broad at base, *folded*, long-tapering, shorter than scape, hirsute and ciliate on both faces, sheaths velvety with retrorse hairs; umbel many-flowered, globular, pedicels nearly four times as long as flowers; spathe shorter than umbel, parted into *ovate-inflated, setaceous-caudate* lobes; perigonium *cream-colored*, .01 long, hemispherical-campanulate, divisions oblong, obtuse, concave, nearly free; filaments adherent to base of perigonium, longer than its divisions, lanceolate-tapering; style exserted — May — Rocky places, Carmel.

34. A. Neapolitanum, Cyr. ♃ .5 to .6; bulbs globular, with scarious tunics. Scape triquetrous, leafy at base; leaves lorate or broad-linear, often .02 broad, tapering; spathe 1-valved, ovate, tapering, shorter than pedicels; umbel many-flowered, .05 to .1 broad, pedicels thrice as long as flowers; perigonium white, .015 broad, *spreading*, divisions *ovate-elliptical*, obtuse; filaments half as long as perigonium, adnate at base, lanceolate, subulate-tapering at tip; style longer than stamens — Spring — Coast to middle mountain regions.

35. A. Schuberti, Zucc. ♃ .3 to .6; bulb ovate, .02 to .03 long. Scape terete, hollow, in fruit .008 thick, leafy only at base; leaves spreading, *lorate-lanceolate*, .01 to .025 broad, flat, *more or less wavy*, rough at margin; spathe short, 2-3-valved; umbel becoming .3 broad in fruit, 20-200 flowered, usually polygamous, pedicels *many times as long as flowers, at length very unequal*, stiff, *the fertile shorter*, *the sterile three to four times as long*, all club-shaped at tip; perigonium pink, divisions connate at base, lanceolate, acute, twice as long as stamens, rigid, spreading after flowering; filaments connate at base, gradually tapering into a subulate cusp — April and May — Fields: common along the coast of southern Palestine, and interior tablelands.

36. A. nigrum, L. ♃ .5 to 1; bulb ovate to globular, .03 to .05 long. Scape .01 thick in fruit, terete, hollow, leafy only at neck;

leaves lanceolate, .02 to .04 broad, acute, flat; spathe ovate, short, at length 2-4-lobed; umbel *nearly spherical, dense*, many-flowered, pedicels nearly equal, twice to thrice as long as flower, naked at base; perigonium white or pale pink, spreading, .015 broad, divisions oblong, obtuse, free, *at length flaccid;* filaments half as long as perigonium, lanceolate, connate at base, tapering — Spring — Fields; common.

37. A. stenopetalum, Boiss. et Ky. ♃ .4 to .5; bulb ovate, .02 to .03 long. Scape terete, leafy below; leaves half as long as scape, lorate-lanceolate to lorate-linear, .01 to .014 broad, flat, tapering, denticulate-scabrous at margin; spathe 3-4-lobed, shorter than umbel; umbel many-flowered, nearly globular, dense; pedicels *capillary*, thrice as long as flower; perigonium *red*, divisions *narrowly linear, at length reflexed;* filaments three-fourths as long as perigonium, flat, connate a little above dilated base, tapering-subulate at tip, the inner somewhat broader; anthers tawny — June — El-Jebel-el-Ahmar (Amanus).

38. A. Orientale, Boiss. ♃ .3 to .5; bulb *ovate-globular*, with white, membranous tunics. Scape thickish, terete, 2-6-leaved at base; leaves oblong-linear to linear, flexuous, usually wavy, long-tapering; spathe shorter than umbel, at length reflexed, 3-4-lobed; umbel many-flowered, hemispherical, pedicels twice to thrice as long as flowers; perigonium white or reddish, divisions *oblong-elliptical, obtuse*, at length flaccid or somewhat reflexed; filaments three-fourths as long as perigonium, connate at base, tapering, yellowish — Spring — Grassy places; common.

39. A. Aschersonianum, W. Barbey. ♃ .3 to .5; bulb ovate with white, membranous, fringed tunics. Scape thick, leafy below, leaves lorate-lanceolate, tapering, usually wavy, denticulate-scabrous at margin, shorter than scape; spathe 2-3-lobed, shorter than umbel; umbel spherical, dense, pedicels twice to four times as long as flower; perigonium *pink*, divisions *oblong-linear*, obtuse, at length reflexed; filaments white, united at base, long-tapering toward tip, somewhat longer than perigonium — Spring — Fields; common. Too near the last.

40. A. Rothii, Zucc. ♃ .1 to .2; bulb ovate, .03 to .05 long, tunics fringed. Scape thick, leafy below; *leaves spread out on the surface of the ground*, as long as scape or longer, lorate-lanceolate, *wavy-contorted*, margins smooth; umbel hemispherical, very dense, pedicels twice to twice and a half as long as flower; divisions of perigonium *blackish-purple*, whitish toward tip, oblong, obtuse; filaments *blackish-purple*, broad-triangular at base, tapering toward tip, as long as perigonium — Spring — Borders of southern Palestine and et-Tih; Syrian Desert.

41. A. Nocanum, Reut. ♃ .3; bulb ovate, medium-sized. Scape leafy below, with membranous sheaths; leaves broad-linear, .01 to .014 broad, with papillose-scabrous margins, usually as long as scape; spathe 1-valved, much shorter than umbel; umbel hemispherical, dense, in fruit .1 to .2 broad, the pedicels *many times as long as flowers, nearly equal;* perigonium pink or white, divisions united at base, broad lanceolate, rather obtuse, at length flaccid; filaments half as long as perigonium, red, connate, and triangular-ovate at base, abruptly tapering — Spring — Fields; Aleppo.

42. A. lachnophyllum, Paine. ♃ Scape 1 to 1,4; naked; leaves 3, narrow-lanceolate, .3 to .6 long, tapering, obtuse, hispidulous at nerves. Spathe 3-4-parted, valves ovate-deltoid, as long as capitate umbel, *suddenly tapering into filiform cusps;* pedicels many times as long as flowers, .15 to .4 long; perigonium .006 long, pale pink, divisions oblong, obtuse; filaments as long as perigonium; style long — Spring — Zîza in the Balqâ.

6. DIPCADI, Med. (UROPETALUM, GAWL.). DIPCADI.

Perigonium tubular-funnel-shaped, parted to or beyond middle into six divisions, the inner valve-like, approximated, the outer falcate, or gibbous beneath tip. Filaments filiform, adnate to tube, anthers linear, versatile. Ovary 3-celled, cells many-ovuled, style straight, stigma somewhat 3-angled. Capsule membranous, 3-lobed and -grooved, and 3-valved at tip. Seeds in one row, flattened or flattened-angled — Bulbous herbs, with linear, fleshy leaves, and flowers in a one-sided raceme.

D. erythræum, Webb. ♃ *Bureiyiṭ. Dhibghiḥ. Zu'eitemân.* .1 to .25; bulb ovate-conical, .02 to .04 long, tunics white. Leaves 3-4, as long as scape or longer. Raceme 6-12-flowered; pedicels very short, nodding, becoming erect in flower; bracts scarious, deltoid-lanceolate, tapering, twice to thrice as long as pedicels; perigonium greenish-yellow, .013 long, the outer divisions hooded, ending in a recurved cusp; capsule sessile, .012 long, ovoid — March — Et-Tîh and southward to Sinai and Egypt.

7. URGINEA, Steinh. SQUILL. *'Unṣul.*

Divisions of perigonium six, spreading, destitute of a nectary. Filaments six, perigynous, adnate to base of divisions, anthers versatile. Ovary 3-celled, ovules numerous in each cell. Style filiform, arising from tip of ovary, stigma capitate, 3-grooved. Capsule parchment-like, globular or oblong, 3-grooved. Seeds numerous in each cell, flattened, winged, arranged one above the other — Bulbous herbs with racemed flowers.

1. U. undulata, Desf. ♃ .2; bulb .03 in diameter. All the leaves radical, appearing after the flowers, spread over the ground, linear, grooved, *wavy-sinuate,* .08 to .1 long. Scape slender, erect, much longer than leaves; raceme loose, .1 long; pedicels ascending, as long as perigonium, with a linear, somewhat spurred bract, half their length; perigonium pale pink, divisions ligulate, obtuse, adnate at base, .01 long; filaments as long as perigonium; capsule ovate, triquetrous, .006 long; cells 3-4-seeded — August and September — Wadi-'Arabah. Bir-es-Sab'.

2. U. maritima, L. ♃ Squill. *'Unṣul.* Bulb .05 to .1 or more in diameter, tunics red. All the leaves radical, appearing in winter after the flowers, erect, long-lanceolate, often .4 to .6 long and .03 to .08 broad. Scape 1 or more high, glaucous, stout,; raceme long, dense; pedicels twice as long as flowers, twice to thrice as long as linear-lanceolate bract; perigonium white, divisions ovate-oblong, obtuse, green-nerved; filaments a little shorter than perigonium; capsule obovate, 3-angled, the cells 3-4-seeded — Summer — Sandy places near coast, and hillsides of lower to middle mountain zones of coast ranges.

8. MUSCARI, Tourn. Muscari.

Perigonium ovate or cylindrical, more or less constricted below mouth, urceolate, with small, ovate-triangular, somewhat reflexed teeth. Filaments inserted at the middle of the tube, nearly as long as the versatile anther. Cells of ovary 3, 2-ovuled, style filiform, stigma capitate. Capsule sessile, triangular, chartaceous — Bulbous herbs with racemed or spiked flowers.

* *Perigonium cylindrical-urn-shaped; filaments in two rows, distinct, somewhat distant. Ovary ovate.*

† *Perigonium* 3-4 *times as long as broad.*

1. M. Pinardi, Boiss. ♃ Leaves linear, channeled, shorter than scape. Raceme *loose, cylindrical*, pedicels horizontal, as long as perigonium or shorter; abortive flowers tubular, one-third to one-half as long as pedicels, forming a long, loose tassel; fertile perigonium tubular-club-shaped, .008 to .01 long — Spring — Lower slopes of Lebanon; Rasheiya; Moab; Marash.

2. M. longipes, Boiss. ♃ Leaves *broad-linear*, .01 to .02 broad, channeled, flexuous, wavy and scabrous-denticulate at margin, shorter than scape. Raceme *rather dense, cylindrico-conical*, pedicels horizontal, twice to six times as long as perigonium; sterile flowers crowded into a conical form, about as long as or longer than pedicels; fertile flowers truncate at base, .008 long — Spring — Fields; hill country and coast of Judea; Palmyrene Desert; Ḥaurân (?).

† † *Perigonium twice to twice and a half as long as broad.*

‡ *Sterile flowers long-pedicelled.*

3. M. comosum, Mill. ♃ .3 to .6; leaves linear to lorate-lanceolate, channeled, .006 to .02 broad, *as long as scape or longer.* Raceme cylindrico-conical, at length elongated, loose; pedicels horizontal; fertile perigonium *brown*, as long as pedicel or shorter; tassel of sterile flowers short, *corymbose*, pedicels 3-6 times as long as *minute, violet-flowers* — April to June — Fields; common.

‡ ‡ *Sterile flowers short-pedicelled or sessile.*

4. M. albicaule, Post. ♃ (Plantæ Postianæ I. 13.) Leaves glabrous, *narrow-linear*, flaccid, longer than *white* scape. Raceme oblong-lanceolate, loose, pedicels *white*, those of fertile flowers thrice to four times as long as flowers; sterile flowers crowded, oblong-tubular, *longer than* pedicels; bracts minute — April — Between 'Ain-el-Beiḍa and el-Jebâh (Palmyrene Desert)

5. M. maritimum, Desf. ♃ .2 to .3; leaves linear, tapering, flaccid, as long as scape or longer; raceme conical, loose; pedicels of fertile flowers *shorter than flowers; sterile flowers few, about as long as pedicels;* bracts minute — Spring — Sands of coast. Rocky divide between Issus and Othmanîyeh.

* * *Perigonium obovate to globular-urn-shaped; filaments in* 1 *row, or obscurely* 2-*rowed; ovary triquetrous.*

† *Perigonium oblong to oblong-cylindrical.*

6. M. racemosum, L. ♃ .2 to .4; leaves linear, grooved at upper surface, flaccid, spread out over the ground, longer than scape. Raceme .03 to .04 long, ovate, *dense*, the uppermost flowers sterile, erect; pedicels of fertile flowers spreading-recurved, shorter than flower

or as long; perigonium *deep blue*, nodding, ovate-oblong to urceolate, teeth white then blue, deltoid, reflexed; valves of capsule nearly orbicular, retuse — Spring — Common from lower mountain zones to alpine regions, and interior plains; Palmyrene Desert.

Var. **stenophyllum,** Post. Leaves .001 broad — Gesbel Dagh (Amanus).

7. M. pulchellum, Heid. et Sart. ♃ .2 to .3; leaves linear, flaccid, the upper surface grooved, longer than scape. Raceme *short-cylindrical*, *loose*, 11-18-flowered, the upper flowers sterile; pedicels shorter than flowers, spreading, at length nodding; perigonium ovate-oblong, violet-blue, teeth white, ovate, obtuse, recurved; valves of capsule orbicular, scarcely retuse — Spring — Antilebanon. Too near the last.

8. M. neglectum, Guss. ♃ .2 to .4; leaves linear, with a broad groove at upper surface, erect-spreading, longer than scape. Raceme *oblong*, *dense*, *flowers imbricated*, the uppermost sterile, erect-spreading; pedicels of fertile flowers recurved, somewhat shorter than flowers; perigonium deep-blue, nodding, ovate-oblong, teeth white, ovate, recurved; valves of capsule obovate-orbicular, rounded at tip — Spring — Aleppo; Kurd Dagh.

9. M. commutatum, Guss. ♃ 1. to .3; leaves linear, grooved, flaccid, spreading, longer than scape. Raceme *short-ovate*, .02 to .04 long, dense, pedicels *much shorter than flowers*, *the lowest shortest*, *nodding ; sterile flowers almost none ;* perigonium *blackish-violet*, ovate-oblong, angled toward tip, .005 to .01 long, teeth obtuse, of the same color as flowers, before flowering connivent, inflexed; valves of capsule ovate-oblong, rounded at tip — Spring — Amanus and Kurd Dagh to Aleppo, Aintâb, and northward.

† † *Perigonium ovate-globular, minute.*

10. M. parviflorum, Desf. ♃ Baby's Breath. .2 to .3; leaves linear-filiform, semiterete, grooved, somewhat shorter than filiform scape. Raceme 6-12-flowered, oblong-ovate, .02 to .03 long, loose; pedicels capillary, about as long as flower, spreading; sterile flowers almost none; perigonium *pale blue*, *sweet-smelling*, ovoid-urceolate, .002 to .033 long, teeth of same color as limb, ovate, recurved; capsule smaller than a pea, valves broader than long, obliquely nerved — September to January — Fields and sandy places, coast to middle mountain zones and interior plains.

9. HYACINTHUS, Tourn. Hyacinth. *Nerjis.*

Perigonium funnel-shaped, lobes 6, spreading. Filaments inserted below the middle of the tube, in 1 row, free, short. Anthers fastened at back, above the base. Style short, stigma obtuse. Ovary 3-celled, with 6-8 ovules in a cell. Capsule depressed-globular, with rounded lobes. Seeds furnished with a funicular, tumid caruncle at base — Bulbous herbs with flowers in racemes.

H. Orientalis, L. ♃ Hyacinth. *Khuzâm. Nerjis. Benjis.* .25 to .4; bulb .02 to .05 long, ovate. Leaves strap-shaped, obtuse, .008 to .015 broad, shorter than scape or longer. Raceme 4-10-flowered, pedicels one-sixth to one-half as long as flowers; perigonium fragrant, deep blue, .02 to .03 long, tube inflated at base, lobes linear-spathulate,

spreading, at length recurved, somewhat shorter than the tube — February to April — Rocks; coast to subalpine regions.

10. BELLEVALIA, Lapeyr. BELLEVALIA.

Perigonium campanulate or tubular, with mouth not constricted, more or less deeply 6-cleft, with erect or somewhat spreading teeth. Filaments inserted near the throat or below the middle of the tube, free above, anthers fixed by middle of back. Ovary 3-angled, with 3, two-ovuled cells. Style elongated, stigma obtuse. Capsule of three, chartaceous or coriaceous cells; seeds not caruncled — Bulbous plants with racemed or spiked flowers.

* *Filaments inserted in throat of tube, anthers at the level of the top of the perigonium. Capsule chartaceous.*

1. B. ciliata, Cyr. ♃ Bulb-ovate, .05 long. Leaves 4-6, *lorate*, .15 to .2 long, often .02 to .04 broad, *margins cartilaginous, densely ciliate.* Scape thick, shorter than leaves; raceme ovate-oblong, .1 to .15 long, lower pedicels 2-8 times as long as flower, in fruit stiff, horizontal; perigonium tubular-campanulate, .008 to .01 long, livid-purple, teeth erect, ovate, acutish, one-third as long as tube, greenish-yellow; filaments triangular-lanceolate, shorter than violet anther; capsule obovate, retuse – Spring — Et-Tîh; Palmyrene Desert; Aleppo; Nusairy Mountains; Kurd Dagh, and northward, and eastward.

2. B. trifoliata, Ten. ♃ .3 to .4; bulb ovate, .02 to .03 long. Leaves 3-4, *linear-lanceolate*, .01 to .03 broad, longer than scape, ciliolulate or non-ciliolulate at margin. Pedicels usually *shorter than flower*, spreading or nodding; perigonium dusky violet, tubular-campanulate, .01 to .018 long, with greenish, ovate-oblong, obtuse teeth, one-fourth as long as tube; filaments longer than *violet* anthers; capsule orbicular, rounded at apex — March to May — Fields; coast to middle mountain zones; common.

3. B. longipes, Post. ♃ (Bulletin Herb. Boissier, III., 165). In flower .5, in fruit .7; bulb ovate, .03 long. Leaves 3-4, linear-lanceolate, .015 to .04 broad, longer than scape, cartilaginous at margin, unarmed or scabridulous. Flowering raceme ovate, .1 to .12 long, pedicels 3 *to* 5 *times as long as flowers*, spreading or nodding; perigonium .008 to .01 long, tubular-campanulate, teeth ovate-oblong, one-third as long as tube; filaments oblong, the free portion as long as anther; fruiting raceme .5 long, .4 broad, pedicels rigid, .15 long, 10-12 *times as long as ellipsoidal*, acutely angled capsule; capsule truncate or slightly retuse — April — Nusairy Mountains; Aintâb, and northeastward.

4. B. macrobotrys, Boiss. ♃ .2 to .35; bulb ovate, .05 long. Leaves 3-5, linear-lanceolate, often .02 to .03 broad, acute, margin membranous, obsoletely scabrous, longer than scape. Raceme loose, cylindrical, .1 long in flower, .2 to .3 in fruit; pedicels once to twice as long as flowers, spreading, in fruit recurved; bracts minute, triangular-ovate; perigonium bluish to whitish or livid, tubular-campanulate, .008 to .01 long, teeth oblong, obtuse, one-third as long as tube; filaments triangular, somewhat shorter than rust-colored anthers; capsule ovate-triquetrous, .008 long, mucronulate, valves obliquely nerved — Spring — Coast to middle and subalpine mountain regions and interior plains.

Var. **minor,** Post. Flowers .006 long, less than half as long as capillary pedicels — Cœlesyria; Marash.

5. B. flexuosa, Boiss. ♃ .1; bulb globular to ovate, .015 to .035 long. Leaves 5-6, lanceolate, tapering at both ends, membranous-margined, denticulate-ciliate, often wavy, longer than scape. Scapes 1-4, ascending or flexuous; raceme ovate, .03 to .04 long in flower, .06 in fruit, pedicels ascending, then spreading or nodding at tip, shorter than flower; bracteoles minute, deltoid, bifid; perigonium lurid, tubular-campanulate, .008 long, teeth oblong, obtuse, half as long as tube; filaments triangular-lanceolate at base, tapering, somewhat longer than *blue* anther; capsule ovate-orbicular, acutely 3-angled, retuse at tip, somewhat stipitate — Spring — Coast to middle mountain region and interior plains; Palmyra.

6. B. densiflora, Boiss. ♃ .15 to .3; bulb ovate. Leaves 3-5, linear-lanceolate, .008 to .01 broad, tapering, glabrous, longer than scape. Scapes 1-3, flexuous; raceme ovate-oblong, *dense*, pedicels erect, *half as long* as perigonium; bracteoles oblong-lanceolate, obtuse; perigonium tubular-campanulate, .008 long, *yellow*, teeth oblong-lanceolate, obtuse, half as long as tube; filaments lanceolate, twice as long as *yellow* anther; capsule obovate, .005 long, 3-angled, retuse — Spring — Merj (Damascus); Aintâb.

* * *Filaments inserted at middle of tube or lower, the anthers low down. Capsule coriaceous.*

7. B. nervosa, Bert. ♃ .05 to .15; bulb ovate, .01 to .02 long. Leaves 2-3, *firm*, *strongly nerved*, membranous-ciliate at margin, *oblong to lanceolate-linear*, .01 to .013 broad, nearly enveloping the scape; as long as it or shorter. Raceme oblong, *spike-like*, .02 to .04 long, dense: bracts scale-like, nearly obsolete; flowers *sessile*, tubular-campanulate; perigonium *light-blue*, .007 long, teeth ovate, obtuse, one-third as long as tube; filaments subulate, longer than *black* anther; capsule .004 long, depressed-globular, *the lobes rounded*, keeled at back, netted-nerved — Spring — Chalky hillsides; interior plains.

11. PUSCHKINIA, Adams. Puschkinia.

Perigonium tubular-campanulate only at base, 6-parted, with rotate, spreading divisions, the crown membranous, 6-cleft at throat of tube. Filaments short, adnate at their inner surface to the tube of the crown, anthers nearly sessile, linear-oblong, versatile. Ovary sessile, obtusely triquetrous, with three, 5-6-ovuled cells, the style filiform, short, the stigma capitate. Capsule membranous. Seeds in cells few, small, globular — Bulbous herbs with aspect of Scilla.

P. scillioides, Adams. ♃ .1 to .3; bulb globular, .015 to .03 long. Leaves 2-3, linear, surrounding the lower part of scape, as long as it, .003 to .012 broad. Raceme 1-6-flowered; pedicels slender, erect, the lower longer than flowers; bracts scaly, minute; perigonium bluish-white, divisions elliptico-oblong, thrice as long as tube; crown a third as long as divisions, cleft to middle into truncate or retuse teeth — Spring.

Var. **Libanotica,** Boiss. Divisions of perigonium .012 long; teeth of crown more acute than in type, bifid — Coast to middle and subalpine mountain zones, and interior plains.

12. SCILLA, L. Squill.

Perigonium of six, spreading divisions, connate at base, destitute

of crown. Filaments six, nearly perigynous, adnate to base of perigonium; anthers introrse, inserted by middle of back. Ovary globular to ovate, sessile or somewhat stipitate, obtusely 3-angled, 3-celled; ovules two in each cell side by side, or numerous superposed. Style obsoletely 3-angled, stigma obtuse. Capsule membranous. Seeds spherical, ovate, or 3-angled, sometimes arillate at base.

* *Flowering in autumn, .08 to .4 high. Flowers .006 to .008 broad. Raceme 6-∞-flowered.*

1. S. autumnalis, L. ♃ Bulb ovate, .01 to .02 long. Leaves 5-6, after flowers, linear-filiform, grooved at upper surface. Scape .15 to .25; raceme 6-20-flowered; pedicels ascending, once to twice as long as flower; bracts 0; perigonium *lilac-pink*, divisions oblong-linear, persistent; filaments blue, petaloid, oblong, a little shorter than perigonium; capsule globular, .003 in diameter, 3-angled; cells 2-ovuled; seeds not arillate — October and November — Coast, and lower mountains.

2. S. fallax, Steinheil. ♃ Bulb ovate, .02 to .04 long, *with tunics produced considerably beyond its tip.* Leaves beginning to appear as flowers develop. Scape much longer than leaves, .2 to .4; raceme many-flowered, at first conical, then long-cylindrical, .1 to .15 long; pedicels ascending, 2-4 times as long as flowers; bracts 0; perigonium *blue*, divisions spreading, obtuse, persistent, .005 long; capsule globular, .002 to .003 in diameter — September to November — Khotsch-Bel (Amanus) 1200 m. A plant of Algeria.

3. S. Hanburyi, Baker ♃ Bulb ovate, .05 to .07 long, with *scarious tunics.* Leaves coming after flowers, linear. Scape .1 to .15, ending in a loose, 15-20-flowered raceme; pedicels spreading, 3-6 times as long as flower; perigonium lilac, divisions ligulate, scarious, with a tawny longitudinal band at their middle; capsule obovate-globular, .003 in diameter, trisulcate — July to October — Damascus to Yebrûd.

* * *Flowering in spring.*

4. S. hyacinthoides, L. ♃ Bulb ovate, .06 to .1 long. Leaves appearing with the flowers, 10-12 in number, *lanceolate-linear*, .02 to .03 broad, acute, minutely ciliate at margin, half to two-thirds as long as scape. Scape 1 high; raceme conico-cylindrical at first then cylindrical, .5 long; pedicels 3-8 times as long as flower, spreading, with a minute bracteole at base; perigonium *violet-blue*, divisions .007 long, spreading; ovary furnished with three nectariferous pores at base of the septa; capsule depressed-globular, smaller than a pea — Spring — Stony places and fields, coast to middle mountain regions and interior plains; Jordan Valley.

5. S. cernua, Red. ♃ Bulb ovate, .01 to .015 long, with blackish-brown outer tunics. Leaves 2-6, sheathing the lower part of the scape, as long as it, *broad-linear*, .005 to .008 broad, obtuse or acute. Scapes 1 to 3, semiterete angled, .1 to .15 high, 1-3-flowered, decumbent after flowering; *pedicels nodding at tip*, the lateral often shorter than flowers; bract minute, deltoid; perigonium *blue*, divisions elliptico-oblong, .015 long, obtuse, with a deeper colored stripe at midrib; *cells of ovary 8-10-ovuled;* capsule ovate, as large as a pea, seeds not arillate — Spring — Tabor and Carmel to Antilebanon, and Aintâb, and northward and eastward.

6. S. bifolia, L. ♃ Bulb ovate, large. Leaves 2, sheathing the scape to its middle, nearly opposite or distant, linear-lanceolate, .004 to .015 broad, grooved, obtuse, spreading or recurved, as long as scape. Scape .2 to .5 high, raceme 8-20-flowered, the lower pedicels 2-4 times as long as flower; perigonium blue, divisions .008 to .01 long, oblong-elliptical, obtuse; cells of ovary 5-6-ovuled; capsule globular, obtusely 3-angled — Spring — Coast to alpine mountains and interior plains.

Var. **nivalis,** Baker. Lower, more slender; leaves narrower; raceme few-flowered; flowers smaller, divisions narrower — At melting snows near top of Jebel Makmel (Lebanon).

13. ORNITHOGALUM, L. Star of Bethlehem.

Perigonium composed of six divisions connate only at base. Filaments six, hypogynous, inserted on the receptacle, or adherent to the base of the perigonium, lanceolate to linear, sometimes tricuspid at tip, anthers versatile. Ovary sessile, 3-celled, ovules numerous, in two vertical rows; style filiform, stigma capitate, somewhat 3-grooved. Capsule membranous, the angles wingless or winged. Seeds obovate or angled — Bulbous herbs with racemed or corymbose flowers, the divisions of the perigonium white, usually with a green band, rarely cream-colored, never blue or purple.

* *Raceme elongated.*

† *All the filaments or three of them tridentate at tip.*

1. O. Libanoticum, Boiss. et Bl. ♃ .3; bulb ovate. Leaves lanceolate, flat, tapering at base, as long as scape, shorter than raceme. Raceme .1 long; pedicels ascending, half as long as flower, in fruit nodding, as long as capsule; bracts scarious, long-tapering, longer than pedicel; divisions of perigonium white without green band, oblong-linear, obtuse; filaments alternately simple and tricuspid, the middle cusp fertile, triangular, acute, the lateral obtuse, shorter; capsule ovate, .01 long, 6-ribbed — May — Valley of Hasroun and about Ehedin.

† † *All the filaments undivided.*

2. O. Pyrenaicum, L. ♃ .5 to .7; bulb ovate. Leaves glaucous, linear, grooved, *usually marcescent before flowering is over*, shorter than scape. Raceme many-flowered, pedicels ascending, as long as flowers or longer, in fruit appressed; bracts lanceolate, tapering, shorter than pedicel; divisions of perigonium *linear-oblong*, .01 long, .0015 broad, yellowish, with a median green band; filaments *three-quarters* as long as perigonium; capsule ovate, .009 long, 3-grooved — June — Woods south of Kessab, and northward.

3. O. fuscescens, Boiss. et Gaill. ♃ .4; bulb ovate. Leaves linear, grooved, .014 to .018 broad, shorter than scape. Raceme many flowered, thyrsoid; pedicels ascending, *twice to once and a half* as long as bract and flower; bracts lanceolate, acuminate, *furnished at middle on either side with a linear lobe;* divisions of perigonium *tawny with a paler margin, elliptical*, obtuse; filaments scarcely half as long as perigonium — Summer — Fields; near Rasheya.

4. O. Narbonense, L. .3 to 1; bulb ovate, .01 to .02 long. Leaves more or less linear, .002 to .01 broad, usually persistent during

flowering, shorter than scape. Raceme long, many-flowered; pedicels ascending, in fruit appressed, longer than flowers and capsules; bracts lanceolate, long-tapering, the lower often longer than pedicels; divisions of perigonium *oblong-lanceolate*, obtuse, .015 long, .003 broad, with a narrow green band; filaments scarcely half as long as perigonium; capsule ovate, .012 long — Summer — Fields; common from coast to alpine regions.

Var. **pyramidale,** Boiss. Larger; leaves broader, sometimes ciliate; raceme elongated, often .2 to .3 long.

Var. **densum,** Boiss. Lower; leaves ciliate at margin; raceme short, dense.

Var. **alpinum,** Boiss. Low; raceme short; pedicels shorter than small flowers — Alpine regions.

* * *Raceme short, ovate or corymbose.*

† *Perigonium milky, divisions destitute of green band.*

5. O. Arabicum, L. ♃ Bulb large, ovate, *proliferous at base.* Leaves broad-linear, acute, somewhat grooved, longer than scape, nearly erect then spreading. Scape thickish; raceme very short, corymbose, pedicels ascending, longer than triangular-lanceolate, acuminate bracts; divisions of large perigonium ovate, obtuse, concave, the outer keeled, mucronate at tip, and obsoletely 3-lobed; capsule obovate, ribs equidistant — Summer — El-Ghôr.

† † *Perigonium white, divisions with a green band.*

6. O. lanceolatum, Labill. ♃ .05 to .1, bulb ovate, .02 to .04 long, *simple.* Leaves 4-8, glabrous, *broad-lanceolate to oblong-lanceolate,* .01 to .025 broad, acutish, *sheathing the scape, and longer than corymb.* Corymb dense, *somewhat capitate among the leaves*, at length elongated, ovate; pedicels at first very short, then more or less elongated, longer than scarious, linear-lanceolate bracts; divisions of perigonium .02 long, oblong-elliptical, obtuse, with a broad stripe of green; filaments one-third as long as perigonium; capsule ovate, .01 long, ribs about equidistant — April to August — Coast to alpine summits of Lebanon and Antilebanon.

7. O. montanum, Cyr. ♃ .2 to .3; bulb simple, ovate, .02 to .025 long. Leaves 3-8, flaccid, *linear-lanceolate*, tapering at tip, .005 to .008 broad, usually longer than scape. Corymb usually many-flowered, pedicels spreading, the lower as long as the lanceolate, long-acuminate bract or longer, and twice to thrice as long as flower. Divisions of perigonium oblong-lanceolate, .015 long, with a broad, green band; filaments from one-third to one-half as long as perigonium; capsule obovate, the ribs equidistant — May and June — Coast to hill country of Galilee and alpine summits of Lebanon, and northward.

Var. **platyphyllum,** Boiss. Plant taller; leaves broader; divisions of perigonium .02 long — Aleppo; Aintâb; Palmyrene Desert.

Var. **pauciflorum,** Post. Scape 1-few-flowered — Nusairy mountains.

8. O. umbellatum, L. ♃ .15 to .3; bulb ovate, *proliferous*, .01 to .03 long. Leaves glabrous, *linear*, *white-banded*, longer than scape. Corymb few-flowered, pedicels spreading, the lower twice to

four times as long as flowers, and somewhat longer than lanceolate, acuminate bracts, to twice as long. Divisions of perigonium oblong, with a broad green band, obtuse, the outer mucronulate; filaments half as long as perigonium; capsule ovate-oblong, .012 long — April — Fields and stony places; middle to alpine mountain regions and interior plateaus.

9. O. tenuifolium, Guss. ♃ .1 to .3; bulb *simple*, ovate, .01 to .02 long. Leaves glabrous, *filiform*, erect, grooved, *nearly or quite destitute of a white band*, as long as scape or longer. Corymb few-flowered; pedicels spreading, the lower twice to five times as long as flowers, and once to twice as long as lanceolate-subulate bract; divisions of perigonium oblong to linear-oblong, with a green band as broad as margin, the outer three obsoletely mucronulate; filaments half as long as perigonium; capsule obovate, somewhat retuse, the ribs acute, *approximated in pairs* — Spring — Hills; coast to middle and alpine regions and interior plateaus.

Var. **trichophyllum,** Boiss. Leaves setaceous—Near Beer Sheba.

10. O. fimbriatum, Willd. ♃ .1 to .2; bulb simple, ovate. Leaves 3-8, linear, .002 to .007 broad, often recurved, clothed with spreading or retrorse hairs, longer than hairy scape. Corymb loosely 8-15-flowered, the lower pedicels twice to thrice as long as flowers, and as long as or longer than the lanceolate, glabrous bracts; divisions of the perigonium oblong-linear, obtuse, with a broad, green band; filaments scarcely half as long as perigonium; ribs of capsule approximated in pairs, narrowly winged — Spring — Middle to subalpine mountain zones.

Var. **ciliatum**, Boiss. Only margins of leaves ciliate — Jerusalem; Nazareth; Nusairy mountains.

11. O. neurostegium, Boiss. et Bl. ♃ .1 to .13; bulb ovate-conical. Leaves 4-5, linear-lanceolate, long-tapering at base and tip, .004 broad, longer than scape, retrorsely hispid. Raceme short, ovate, 5-7-flowered, pedicels scarcely longer than flowers, stiff; bracts longer than pedicel, lanceolate, acuminate, *many-nerved*, white-margined; divisions of perigonium .012 long, oblong-linear, obtuse, pale green at back, *many-striate, narrowly white-margined;* filaments one-third as long as perigonium; ovary top-shaped, subulate — Summer — Jurd Tannurîn.

14. LILIUM, L. Lily. *Zenboq.*

Perigonium deciduous, campanulate or revolute, divisions equal, oblanceolate, the claws furnished with a longitudinal, nectariferous groove. Stamens 6, somewhat perigynous, anthers versatile. Ovary sessile, 3-celled, style long, undivided, stigma 3-angled. Capsule obovate, hexagonal. Seeds numerous, discoid — Stemmed herbs, with scaly bulbs.

L. candidum, L. ♃ 1 or more; bulbs ovoid, yellow, .1 long. Root-leaves in winter 6-8, oblanceolate; lower stem-leaves spreading to ascending, oblanceolate, wavy, rather obtuse, upper appressed, lanceolate, acute, much smaller. Raceme thyrsoid; pedicels erect, nodding at tip, with bracts and sometimes bracteoles at base; perigonium white, .05 to .1 long, sweet-scented, funnel-campanulate, divisions oblanceolate; anthers yellow — May — Rocks; Kesruwân (Lebanon).

15. FRITILLARIA, L. Fritillaria.

Perigonium deciduous, divisions 6, obovate to oblong-spathulate, furnished with a nectariferous pit at or above base. Stamens 6, perigynous, shorter than perigonium, anthers fixed near base. Ovary sessile, 3-celled. Style filiform, more or less parted into 3 stigmas, or undivided. Capsule obovate or cylindrical, usually short-stalked, obtusely or acutely hexagonal; seeds numerous, discoid — Bulbous, caulescent herbs, flowers campanulate or obconical.

* *Bulbs small. Flowers terminal, solitary or few.*

† *Style trifid. Perigonium campanulate.*

1. F. acmopetala, Boiss. ♃ .6; stem 1-2-flowered, leafy for its upper two-thirds. Leaves linear to linear-lanceolate, the uppermost tapering. Flower .04 long, nodding, cylindrical-campanulate, divisions oblong-oblanceolate, *abruptly contracted into a more or less recurved mucro,* with an ovate-oblong nectary at somewhat gibbous base, brownish-red with yellowish margins, yellow within, red-tesselated below; filaments papillose, once and a half as long as anther; style trifid beyond middle; capsule .035 long, oblong-club-shaped — Spring — Subalpine regions of Lebanon, Amanus, and northward.

Var. **inermis,** Post. Divisions of perigonium obtuse, papillose at tip. Perhaps this is **F. Olivieri,** Baker.

2. F. crassifolia, Boiss. et Huet. ♃ .1 to .25; stem 1-2-flowered, 5-6-leaved above middle. Leaves fleshy, oblong-lanceolate .015 to .02 broad, to linear-lanceolate .005 broad, all acute. Flower campanulate, .02 to .025 long, nodding, brownish-yellow, with red, longitudinal lines, and mottled with red at inner face; divisions oblong-elliptical, obtuse, furnished with a small, ovate nectary above base; filaments nearly twice as long as anthers; style trifid for one-third of its length, capsule globular-top-shaped, .015 long and broad, obtusely angled — Spring — Alpine Lebanon; Suq-Wadî-Barada; Aintâb.

Var. **Hermonis,** Boiss. Flower smaller, deeper colored — Top of Hermon.

† † *Style entire or obsoletely trilobed. Perigonium obconical.*

3. F. viridiflora, Post. ♃ (Bulletin Herbier Boissier, III., 164). .2; stem 1-2-flowered, leafy from middle. Leaves *opposite* or scattered, oblong-lanceolate to linear-lanceolate, lower .07 long .013 broad, upper shorter and narrower, all rather obtuse, *the upper three usually forming an involucre.* Flower .025 to .03 long, *obconical-cylindrical,* rounded at base; peduncle nodding, one-half to one-third as long as flower; divisions of perigonium oblong, *green, parallel-nerved;* stamens half as long as perigonium, filaments papillose, twice as long as anther; style undivided, 3-grooved, about as long as ovary; stigma short-3-lobed — April — Stony, inundated fields in the Kurd Dagh.

* * *Bulb large, scaly. Inflorescence racemed. Style simple.*

4. F. Libanotica, Boiss. ♃ 1, glaucous; stem thick. Leaves crowded, ternately whorled, oblong-lanceolate to lanceolate, .01 to .025 broad, acute, oblique. Raceme .15 to .3 long, 10-25-flowered; peduncles nodding, once and a half as long as flower; perigonium obconical, .014 long, *lilac-yellow,* with deeper colored veins, divisions obovate, obtuse, with an ovate nectary at base; filaments papillose, 4-5 times as

long as anther; style shorter than stamens; capsule oblate-spherical, .02 long and broad, hexagonal — Spring — Stony places; middle mountain zones and interior plains.

* * * *Bulb large, scaly. Inflorescence umbelled.*

5. F. Aintabensis, Post. ♃ (Bulletin Herbier Boissier, III., 164). .6 to .8; stem leafy from middle. Leaves linear-lanceolate to linear, the lower in pairs, the intermediate scattered, the floral whorled, forming an involucre to the inflorescence. Umbel (in the unique specimen) 4-flowered, peduncles simple or forked, longer than floral leaves, 4-5 times as long as flowers, nodding at tip; perigonium .025 long, oblong-campanulate, brown, divisions oblong-elliptical, obtuse; filaments as long as anthers, one-third as long as perigonium; style as long as stamens, thick, obtusely 3-lobed at tip — March — Highlands near 'Aintâb.

16. TULIPA, L. Tulip. *Zenboq. Shaqîq.*

Perigonium deciduous, divisions six, oblong or obovate, always destitute of a nectariferous pore. Stamens 6, shorter than perigonium, hypogynous, filaments dilated at base, tapering toward tip; anthers fixed at base. Ovary sessile, 3-celled; style 0; stigmas 3, short, reflexed, grooved. Capsule oblong or obovate. Seeds numerous, discoid — Caulescent herbs, the bulbs with tunics, the flowers usually solitary, campanulate.

* *Filaments glabrous. Divisions of perigonium somewhat unequal.*

† *Tunics of bulb densely woolly within.*

1. T. Oculi-Solis, L. ♃ .3 to .4; leaves 3-4, oblong-lanceolate .015 to .02 broad to linear-lanceolate. Perigonium .06 to .1 broad, crimson, divisions ovate-lanceolate, all or the inner 3 *tapering* with an *oblong-lanceolate, blackish spot at base, surrounded by a yellowish margin, and with a fringed or 3-dentate tip;* stamens one-third to one-fourth as long as perigonium; capsule oblong, .035 long, .015 broad — Spring — Fields; common to subalpine regions.

Var. **Aleppica,** Baker. Flower smaller, divisions narrower — Aleppo.

2. T. præcox, Ten. ♃ .3 to .5; leaves 3-5, oblong-lanceolate, the lower often .06 broad. Perigonium rounded-campanulate, crimson, .06 to .1 broad, divisions ovate-oblong to obovate-oblong, the outer acute, the inner obtuse, all with an *obovate*, blackish spot at base, surrounded by a yellowish border with eroded tip; stamens one-third as long as perigonium — Spring — Palestine; Aleppo to Aintâb.

3. T. montana, Lindl. ♃ .2 to .4; leaves 3-4, oblong-lanceolate .02 to .04 broad to linear-lanceolate, often falcate, wavy-margined. Perigonium .06 to .1 broad, palish at outer, crimson at inner surface, divisions ovate to ovate-oblong or obovate, acute or obtuse, sometimes cuspidate, with an oblong, blackish spot at base, surrounded by a yellow margin; stamens one-third as long as perigonium; capsule oblong, cuspidate, .04 long, .018 broad — Spring — Common to subalpine regions.

3. T. Clusiana, Vent. ♃ Leaves 4-5, linear-lanceolate to linear, grooved. Perigonium campanulate, funnel-shaped, divisions *pink out-*

side, white-margined, white within and bluish at base, elliptico-lanceolate, tapering at both ends, the outer acute, the inner obtuse; stamens one-third to one-fourth as long as perigonium — Spring — Aleppo.

† † *Tunics of bulbs glabrous within or sparingly appressed-hirtulous at tip.*

4. T. Gesneriana, L. ♃ Bulb large, tunics sparingly bristly within. Stem tall. Leaves 3-5, below the middle of stem, glaucous, oblong-lanceolate to lanceolate. Perigonium globular-campanulate, *yellow or crimson*, divisions with a black spot within, obovate-oblong, the interior obtuse; filaments one-third as long as perigonium, as long as anther or longer; ovary oblong-cylindrical, tapering at tip — Spring — Gilead and Moab.

* *Filaments penicillate at base. Leaves of perigonium nearly equal.*

5. T. Lownei, Baker. ♃ Bulb small, ovate. Stem .07 to .1, 1-2-flowered. Leaves 2, lorate-lanceolate, falcate, .01 broad. Perigonium campanulate-funnel-shaped, divisions .02 long, oblong-elliptical, acute, ciliate at base, the outer *deep pink at interior face, the inner lighter-colored, all white at inner face*, with a yellow spot; filaments half as long as perigonium; capsule ovate-globular, obtuse-angled, abruptly mucronate — Alpine Lebanon and Hermon.

6. T. biflora, L. ♃ .15 to .2, stem slender, 1-5-flowered. Leaves 2-3, lorate-lanceolate to linear, flat. Perigonium campanulate-funnel-shaped, *greenish-blue without*, white within, divisions *elliptico-lenticular*, acute; stamens half as long as perigonium; capsule globular, 3-angled, obtuse, abruptly apiculate — Spring — Deir 'Atîyeh to el-Mahîn.

17. GAGEA, Salisb. Gagea.

Divisions of funnel-shaped perigonium 6, connate at base, flat. Filaments 6, adnate at base to perigonium, subulate, anthers ovate to oblong, fixed by base, and perforated to receive the filament. Ovary 3-angled, 3-celled. Ovules numerous, in two rows at the central angle of cell, horizontal. Style subulate, 3-angled, stigma capitate, 3-lobed. Capsule membranous, sessile or stipitate. Seeds ovate, angled, or flattened — Bulbous herbs with umbelled or corymbose flowers, divisions of the perigonium yellow or green with yellow margins.

* *Bulbs* 2 *in one sheath, stem rising between them. Radical leaves* 1-2. *Seeds round-ovate.*

1. G. Liottardi, Sternb. ♃ Root-leaf usually 1, *junciform, hollow*. Stem 1-5-flowered, corymbose, stem-leaves 2, opposite, lanceolate, *glabrous*, one larger, convolute, spathe-like. Pedicels 1-5 times as long as flower, villous or glabrous, naked or supplied with a bracteole; divisions of *glabrous* perigonium lanceolate-elliptical, obtuse; capsule somewhat stipitate, top-shaped, three-fourths as long as perigonium — Spring and summer — Hermon by the melting snowdrifts.

2. G. arvensis, Pers. ♃ Root-leaves 2, linear-lanceolate to filiform; floral leaves 2, opposite, lanceolate, *pubescent or villous*, tapering, the lower forming a sort of spathe. Flowers 3-12, umbelled or corymbed, pedicels usually with linear bracteoles, villous; perigonium yellow, divisions *lanceolate, acute*, pubescent without, especially at base and tip; filaments two-thirds as long as perigonium; capsule obovate-oblong, obtuse or retuse, somewhat shorter than peri-

gonium — February to May — Palestine to subalpine and alpine Lebanon, Damascus, Aleppo, and northward.

3. G. foliosa, Presl. ♃ Root-leaves 2, linear; stem-leaves 2, alternate or rarely opposite, *glabrous or ciliate*, the lower forming a sort of spathe. Flowers 1-few, corymbed; pedicels simple or forked and then furnished with linear bracteoles, villous; perigonium yellow, divisions *linear-oblong*, *obtuse*, elongated in fruit, glabrous or villous at base; filaments two-thirds as long as perigonium; capsule *obcordate*, about half as long as perigonium — February to May — Common. Too near the last, probably only a variety of it.

4. G. Bohemica, Zauschn. ♃ Tufted. Root-leaves *setaceous*-filiform, longer than stem. Stem low, 1-3-flowered; floral-leaves alternate, lanceolate, acuminate, pedicels short, villous; divisions of perigonium *oblong-spathulate*, *obtuse*, yellow, with paler margins; filaments three-quarters as long as perigonium; capsule obovate-oblong — Spring — Less common than the last two.

* * *Bulb* 1, *erect*, *enveloped by tunics*, *the radical leaf from the tip*, *and the flowering stem lateral*, *near the base*. *Seeds flattened.*

5. G. reticulata, Pall. ♃ Tunics numerous, *produced into a more or less elongated*, *reticulated sheath ;* stem more or less exserted from sheath, 1-flowered or with 2-5-umbelled flowers. Leaves linear to filiform, crisp-puberulent, the upper *somewhat whorled under the umbel.* Pedicels thickish, much longer than flower; divisions of perigonium lanceolate, *acute to acuminate*, many-striate, green with yellow margins; filaments half as long as perigonium; capsule obovate-oblong, obtuse, two-thirds as long as perigonium — Spring — Common.

Var. **tenuifolia**, Boiss. Leaves filiform, often circinnate-recurved — Sinai; subalpine Lebanon; Antilebanon Plateau; Palmyra.

6. G. Damascena, Boiss. et Gaill. ♃ Tunics *produced into short lobes*, *scarcely fibrous*, *at length separated into fibres ;* stem more or less elongated, forked, 2-4-flowered. Leaves puberulent, linear; floral leaves lanceolate. Pedicels elongated, stiff in fruit; divisions of perigonium *oblong-linear*, *obtuse*, 5-6-striate, green, yellow-margined; filaments two-thirds as long as perigonium; capsule oblong-club-shaped, truncate, somewhat shorter than perigonium — Spring — Common.

7. G. chlorantha, M. B. ♃ Tunics scarious, produced along the base of the stem, *and there separated into fibres ;* radical leaf filiform, longer than stem; stem-leaves alternate, filiform to narrow-lanceolate, usually ciliate-margined. Pedicels thickish, 1-3, simple or 2-3-flowered, bracteoled at the forks; divisions of perigonium oblong, *obtuse*, green, yellow-margined; filaments half as long as perigonium; capsule elliptical-oblong — Spring — Near Jerusalem.

8. G. Persica, Boiss. ♃ Tunics scarcely produced along base of stem; stem slender, flexuous, leafless below, forked-corymbose above; radical leaf elongated; *lower stem-leaf lanceolate*, *clasping*, *flat*, *many-nerved*, usually ciliate, the others short, filiform; *bulblets in axils* 1-5, *small*, *naked*. Pedicels capillary, twice to thrice as long as flower; divisions of perigonium .006 long, oblong-lanceolate, obtusish; filaments somewhat shorter than perigonium; stigma capitate-trilobed; capsule club-shaped triquetrous, stipitate, truncate — Spring — Alpine Lebanon about and above Cedars.

18. LLOYDIA, Salisb. Lloydia.

Perigonium marcescent, divisions at length somewhat elongated, with or without nectary. Stamens 6, hypogynous, shorter than perigonium, filaments filiform, anthers attached by deeply perforated base. Ovary sessile, oblong-cylindrical, 3-celled. Style short, stigma obtuse. Capsule membranous, obovate. Seeds small, triangular, flattened — Bulbous herbs, with aspect of Gagea, but with white or pinkish-green perigonium.

L. rubroviridis, Boiss. et Ky. ♃ Bulbs clustered, with membranous tunics, and bulblets at base. Root-leaves 1-2, linear, often as long as scape; scape corymbose, 3-5-flowered; stem-leaves 2-4, linear. Pedicels twice to four times as long as flowers; perigonium funnel-shaped, divisions .012 to .015 long, linear-elliptical, not nectariferous at base, *greenish-white, pinkish at tip*, 3-5-nerved; stamens two-thirds as long as perigonium; capsule enclosed in the persistent perigonium, oblong-club-shaped, truncate — April — Subalpine and alpine Hermon and Antilebanon; Jerusalem.

20. COLCHICUM, L. Colchicum. *Za'farân.*

Perigonium colored, funnel-shaped, with elongated tube and six-parted limb. Stamens 6, inserted at throat, anthers oblong or linear, versatile, introrse. Ovary 3-celled, ∞-ovuled. Styles 3, free, filiform, long-exserted from tube, stigma punctate, terminal. Capsule ovate-oblong. Seeds globular — Herbs with a corm, or rarely with a rootstock, the leaves and flowers included in a radical spathe.

* *Flowers in autumn, leaves in spring.*

† *Styles straight; stigmas dot-like. Perigonium not tesselated.*

1. C. lætum, Stev. ♃ Corm .03 long, with dark brown tunics extending to surface of ground. Leaves erect, lanceolate, tapering to tip, acutish. Flowers 1-12, pale lilac; tube 3-4 times as long as limb; divisions of perigonium .02 to .03 long, obovate-oblong to elliptical, *glabrous at base within;* stamens half as long as limb; anthers *half* as long as filaments; styles *shorter* or longer than stamens — October and November — Lebanon to Cassius, Amanus, and northward.

2. C. Decaisnei, Boiss. ♃ Corm .02 to .03 long, with dark brown tunics extending to surface of ground. Leaves lanceolate, tapering to tip, acutish. Flowers 4-12, pale pink to white; tube 4-5 times as long as limb; divisions of perigonium .06 to .07 long, elliptical, *puberulent at base within;* stamens half as long as limb or less; anthers *one-third* as long as filaments; styles *longer* than stamens — October and November — Middle to subalpine Lebanon, and Cœlesyria; Amanus.

3. C. latifolium, Sibth. et Sm. ♃ Corm about as large as a walnut; tunics thick, more or less projecting above the ground. Leaves ovate-oblong, .12 to .35 long, .04 to .08 broad. Flowers 1-7, lilac-purple, tube 4-5 times as long as elliptical-oblong, tesselated divisions of perigonium; stamens two-thirds as long as limb; anthers somewhat curved; styles longer than anthers, curved at tip, stigmatose on their convex aspect — August — Amanus.

* * *Flowers and leaves appearing together.*

4. C. fasciculare, L. ♃ *Baisûr.* Leaves 5-7, spreading, lanceolate, in fruit .2 long, .05 to .08 broad, tapering, ciliate or glabrous

at margin. Flowers numerous, tube twice and a half as long as white limb, divisions lanceolate-lenticular, with two parallel folds within rarely ending in a triangular-lanceolate tooth; stamens half as long as perigonium; style straight, somewhat longer than anthers; stigma dot-like — December to February — Sinai; Haurân; Damascus; Aleppo; Aintâb; Marash.

Hart says that he found **C. montanum,** L., on the Judean plains, also between Gaza and el-Ghôr, and on the summit of Mt. Hor. Probably this species.

5. C. Ritchii, R. Br. ♃ Corm oblong, .02 to .03 long, with 6 brown, leathery tunics, prolonged above bulb. Leaves lanceolate-linear to linear, spreading-reflexed, the margin often scabrous. Flowers 2-8, pink to white, tube included, thrice as long as limb, divisions of perigonium elliptico-linear, obtuse, 7-9-nerved, with two parallel entire or 1-4-fringed-incised folds at base of inner surface; filaments 3-4 times as long as tawny anther; styles straight, somewhat longer than stamens, stigma dot-like — December and January — Sinai; Damascus plateau, and northward to Antilebanon plateau and Aintâb.

6. C. brachyphyllum, Boiss. et Haussk. ♃ Corm .01 to .02 long, ovate, tunics not produced along scape. Leaves flat, .05 to .07 long, .02 to .03 broad, oblong to lanceolate, obtuse to acute. Flowers numerous, white to pale pink, tube 5 times as long as 7-9-nerved, elliptico-lanceolate, acute divisions; divisions with two, entire, parallel folds at base of inner face; stamens half as long as limb, filaments twice as long as tawny anther; style scarcely as long as anthers, straight; stigma dot-like — December to January — Ain Sofar (Lebanon); Cœlesyria; Antilebanon; Damascus; Aleppo; Aintâb.

7. C. Steveni, Kunth. ♃ Corm oblong, .02 long, with dark brown tunic, prolonged into a tube as far as surface of soil. Leaves 5-7, linear-filiform. Flowers 3-10, clustered, *pink* or white; tube long-exserted from spathe, 5-6 times as long as limb; divisions linear-elliptical, .02 long; stamens half as long as limb; filaments twice to thrice as long as yellow anther; styles longer than anthers, with oblique stigma — November — Coast and lower regions of coast ranges; Jebel-Katarina (Sinai); Mt. Hor.

8. C. Libanoticum, Ehr. ♃ Corm small, oblong, tunics tawny, scarcely produced beyond neck. Leaves 3, lanceolate, at flowering .03 to .04 long, .01 to .014 broad, acute. Flowers 2-4, pink; tube slender, twice to thrice as long as limb, divisions .015 to .018 long, elliptical-oblong, obtuse, 8-10-nerved, with two folds at inner aspect of base; stamens half as long as limb; anthers yellow, one-third as long as filaments; styles as long as stamens, stigma dot-like — June — Near snow-drifts; Sunnîn.

21. MERENDERA, Ram. MERENDERA.

Perigonium destitute of tube, 6-parted, divisions clawed, the lamina grooved below to receive the filament, with or without auricles at base. Stamens 6, inserted at base of limb, anthers extrorse, either oblong and versatile, or linear and inserted by base. Ovary 3 celled, cells many-ovuled. Capsule oblong, septicidally 3-valved from tip; seeds globular, turgid — Stemless, cormed herbs with aspect of Colchicum, the leaves and flowers appearing together, enclosed in an obtuse spathe.

M. sobolifera, C. A. M. ♃ Corm minute, at the tip of a horizontal, cylindrical, thickish sprout. Leaves 3, as long as flowers, linear, at length elongated. Flowers 1-2, lilac; claws filiform; limb .025 long, linear-lanceolate, obtuse, tapering at base, and furnished with two, long, linear-setaceous auricles, directed backward; filaments about half as long as divisions — Spring — Damascus to Antioch, Aleppo, and northward.

22. ERYTHROSTICTUS, Schlecht. ERYTHROSTICTUS.

Perigonium destitute of tube, 6-parted, divisions clawed, the limb with 1-2 nectariferous points at the insertion of filament. Stamens 6, inserted at base of limb. Anthers extrorse, versatile. Ovary 3-celled, ovules crowded one above another in cells. Styles 3, free, stigmatose at tip. Capsule oblong, septicidally 3-valved; seeds globular, puncticulate — Cormous, low herbs, the leaves forming an involucre for the crowded, corymbed flowers.

E. Palæstinus, Boiss. ♃ .05 to .1; bulb ovate, with brown tunics, produced along the long subterranean neck; stem short. Leaves rosetted, longer than corymb, the lowermost usually a pair, lanceolate, tapering, the others oblong-lanceolate, less tapering. Pedicels short; perigonium lilac, limb somewhat longer than claw, oblong-lanceolate, obtuse, pellucid-dotted; filaments half as long as limbs; anthers oblong — April — Jerusalem? Around Dead Sea and Jordan Valley.

ORDER CXIII. JUNCACEÆ, Bartl. (RUSH FAMILY).

Grass-like or sedge-like herbs, with small flowers, a regular and hypogynous persistent perigonium of six, similar, glumaceous divisions, with 2-celled anthers fixed by their base, a single, short style, and 3, filiform, hairy stigmas, and an ovary either 3-celled, or 1-celled with 3 parietal placentæ, forming a loculicidal, 3-valved pod — Ovary sessile, free: seeds anatropous, with a nearly cylindrical, minute embryo, enclosed in the base of the albumen.

JUNCUS, L. RUSH. *Saumar. Bardi.*

Divisions of perigonium equal or unequal, connate at base. Stamens inserted at base of divisions. Ovules numerous, placentæ at angles of cells. Capsule 3-celled, or by retraction of septa 1-celled, with parietal placentæ, and loculicidally three-valved. Seeds numerous, nearly horizontal, with the testa sometimes saccate-relaxed — Perennial or annual herbs, with simple, leafless or leafy stems, the leaves terete, sheathing at base, hollow or grooved or flat, sometimes horizontally septate.

* *Perennials.*

† *Stems without nodes, naked, except at base of inflorescence, sheathed at base, some fertile, others sterile, leaf-like. Seeds not caudate.*

1. J. effusus, L. ♃ 1 or more; root-stock horizontal; stems terete, smooth when fresh, striate when dry, *pith continuous.* Inflorescence pseudo-lateral, *much branched, spreading;* divisions of perigonium *straw-colored,* lanceolate, acute, nearly equal; stamens *three;* capsule *obovate,*

elliptical, obtuse, mucronate, — April to July — Wet places, common throughout, even in Sinai and the other deserts.

2. J. glaucus, Ehr. ♃ 1 to 1.5; root-stock horizontal; stems rigid, terete, *glaucous*, with glossy brown sheaths at base, and *interrupted pith*. Inflorescence pseudo-lateral, branches condensed or spreading; divisions of perigonium *brownish-straw-colored*, lanceolate, acute; stamens *six;* capsule *elliptical-oblong*, obtuse, mucronate — April to August — Common from coast to subalpine regions.

† † *Stems without nodes, but with leaf-bearing sheaths at base. Leaves terete, pungent, not septate. Seeds caudate. Stamens six.*

3. J. acutus, L. ♃ *Saumar. Sammâr. Sumr.* .6 to 1 or more; trunks clustered; stems numerous, terete, firm; leaves and bract longer than inflorescence, pungent. Panicle pseudo-lateral, much branched, many-flowered, *cymose-corymbose*, more or less crowded; divisions of perigonium pale to brownish, the outer lanceolate, obtusish, the inner *ovate, scarious-tipped, retuse;* capsule ovate-globular, acute, imperfectly 3-celled, twice as long as perigonium — April to August — Common along coast, and salty places in interior.

4. J. maritimus, Lam. ♃ *Saumar. Sammâr. Sumr.* 1 or more; root-stock horizontal; culms numerous; leaves and bract as long as panicle or shorter. Panicle pseudo-lateral, the cymes 2-7-flowered, *crowded;* divisions of perigonium pale, somewhat unequal, the outer lanceolate, acute *or acuminate*, the inner *obtusish;* capsule elliptical, obtusely 3-angled, as long as perigonium or longer — April to August — Syrian coast.

Var. **Arabicus,** Asch. et Buch. Capsule elliptical-lanceolate; divisions of perigonium not acuminate — About Dead Sea.

† † † *Stems leafy. Leaves terete, hollow, not septated. Panicle terminal. Capsule 3-celled. Seeds not caudate. Stamens six.*

5. J. subulatus, Forsk. ♃ *Halein.* .5 to 1; root-stock horizontal, creeping to long distances; culms numerous, terete. Panicle with a leaf, often reduced to a sheath at its base, *much compounded;* flowers solitary, in few-flowered cymules; perigonium pale, divisions lanceolate, scarious-margined, mucronate; capsule elliptical, somewhat 3-angled, *obtuse*, mucronate, .003 long, about as long as perigonium — Spring and summer — Around Dead Sea; Syria.

† † † † *Stems leafy. Leaves linear, grooved, not septate. Panicle terminal. Capsule 3-celled. Seeds not caudate.*

6. J. Gerardi, Loisel. ♃ Black Grass. .4; root-stock creeping; culms *slender, somewhat flattened*, leafy toward base, and with *usually one leaf about middle*. Panicle thyrsoid, .05 to .1 long, *moderately compounded, branches erect;* flowers solitary in corymbs; divisions of pale or brownish perigonium nearly of equal length, ovate-oblong, *obtuse*, scarious-margined; capsule oblong, .003 long, about as long as perigonium — Spring and summer — Alpine summits of Lebanon; interior plains.

† † † † † *Stems leafy. Leaves flat. Seeds caudate. Stamens six.*

7. J. sparganifolius, Boiss. et Ky. ♃ .4 to .5; root-stock horizontal, stoloniferous; stems tall, flattened, sheathed at base, *leafy*

along their whole length; leaves linear, acute, 8-10-nerved, .006 to .008 broad at base. Panicle terminal, corymbose, with a bract at base shorter than flowers; flowers 5-7 in a head, crowded, stellate; bracts aristate-tapering; divisions of perigonium lanceolate, tapering-subulate; capsule * * — July — Pebbly places in torrent above 'Arsûs.

† † † † † † *Stems leafy. Leaves terete or compressed, hollow, with transverse septa. Panicle terminal. Stamens six. Seeds caudate.*

8. J. punctorius, L. ♃ 1 or more; root-stock thick, creeping; stems tall, terete, somewhat flattened, with obtuse, leafless sheaths at base, and *one*, terete, pungent leaf *toward middle*, longer than inflorescence. Panicle compound, dense or spreading, composed of dense, globular, many-flowered clusters; divisions of perigonium *rusty*, equal, scarious-margined, linear-lanceolate, the outer acute, concave, the inner flat, obtusish; capsule ovate, 3-angled, 3-celled, short-apiculate, somewhat longer than perigonium — July — Sinai; Shetûra.

9. J. lamprocarpus, Ehr. ♃ .4 to .6; root-stock clustered, often stoloniferous; culms flattened-terete, leafy, ascending or decumbent; leaves terete-compressed, when dry fine-striate. Panicle compound, loose, corymbose; heads 4-10-flowered; divisions of perigonium brown, equal, narrowly scarious-margined, lanceolate, the outer acute, the inner obtusish or acute; capsule glossy, ovate, acute, 1-celled, abruptly mucronate, longer than perigonium — Summer — Common throughout.

10. J. pyramidatus, Lahm. ♃ .4 to 6; root clustered, *furnished with suckers, creeping above the ground;* stems erect, leafy, leaves somewhat compressed, hollow, nodose, striate. Inflorescence corymbose, simple or compound, with short, spreading branches; clusters hemispherical, 6-20-flowered; divisions of perigonium brown, lanceolate, acuminate-aristate, white-margined, 1-nerved, striate, nearly equal; capsule acutely 3-angled, *pyramidal*, tapering into a beak a third longer than perigonium — Summer — Common.

Var. **Kotschyi,** Boiss. Smaller. Capsule less acute.

* * *Annuals. Stamens six. Seeds not caudate.*

11. J. bufonius, L. ⊙ .1 to .3; many-few-stemmed; stems slender, erect or diffuse, *leafy;* leaves linear-setaceous, grooved at base. Flowers solitary, more or less remote in erect, corymbose cymes; divisions of perigonium pale, lanceolate-subulate, membranous-margined, the outer longer; capsule oblong, triquetrous, obtuse, mucronulate, shorter than perigonium — Spring and summer — Common.

Var. **fasciculatus,** Koch. Flowers in dense, head-like clusters.

12. J. Tenageia, Ehrh. ⊙ .1 to .3; stems filiform, simple or branched, 1-2-leaved; leaves setaceous, grooved at base. Flowers solitary, remote, in loose cymes, forming a diffuse panicle; *branches of cymes bifid;* divisions of perigonium ovate-lanceolate, acute, equal; capsule nearly globular, obscurely 3-angled, obtuse, mucronate, about as long as perigonium — Summer — Subalpine Lebanon and Cœlesyria.

ORDER CXIV. **PALMEÆ,** Juss. (PALM FAMILY).

Trees, with graceful, pinnate or palmate leaves, crowded at the top of the trunk, (ours) diœcious, white flowers, inserted

on the branches of a spadix, enclosed before flowering in a spathe, and a perianth of fleshy divisions in two rows. Staminate flowers: stamens six, in two rows, rarely 3, filaments free or connate at base. *Pistillate flowers:* ovary free, carpels 3, either distinct or coalesced. Ovule 1 (rarely 2), erect, orthotropous, or more or less anatropous. Styles very short, as many as carpels or cells. Fruit a berry or drupe, 3-lobed, 3-celled, or by abortion 1-celled and 1-seeded, sarcocarp fleshy or fibrous, endocarp parchment-like, fibrous or woody. Seed filling the cell, the testa usually coalesced with the endocarp. Albumen copious, cartilaginous or woody, usually occupying the folds of the testa. Embryo various — An immense tropical order, represented in our district by two genera.

1. PHŒNIX. Tall, unbranched trees, with pinnate leaves and edible fruits (dates).

2. HYPHÆNE. Trees with forked branches, palmate leaves, and fruits like small cocoanuts, with fibrous sarcocarp enclosing a stone of woody texture. Albumen of ivory hardness, hollow.

1. PHŒNIX, L. Palm. *Nakhl.*

Flowers diœcious, on a much branched spadix, surrounded before opening by a simple spathe. *Staminate flowers:* calyx cup-shaped, 3-toothed, corolla with 3, valvate petals. Stamens 6 or 3, anthers nearly sessile. *Pistillate flowers:* calyx cup-shaped, 3-toothed. Corolla of 3, imbricated petals. Ovaries 3, ovate-globular, distinct, stigmas sessile, hooked. Fruit a date, 1-seeded, sarcocarp soft, edible, seed with a longitudinal groove, horny albumen, and dorsal or subbasilar embryo.

Ph. dactylifera, L. Date. *Nakhl. Balh.* ♄ 10 to 15 or more. Leaves glaucescent, oblong-lanceolate in outline, 2-3 metres long, *rachis* (*jarîd*), thick, semiterete, pinnæ lanceolate-linear, acuminate, folded lengthwise. Branches of spadix long, flexuous; dates sessile, ovate to elliptico-cylindrical — Spring — Common, especially southward. Cultivated in many varieties.

2. HYPHÆNE, Gaertn. Doum Palm. *Dûm.*

Flowers diœcious on a spadix with two ranked branches, each branch imperfectly enclosed in a spathe, cylindrical, beset with densely imbricated, hairy scales. Flowers small, solitary in axils of scales, subsessile. *Staminate flowers:* calyx 3-parted. Corolla of 3 petals. Stamens 6, with free filaments. Anthers ovate, bifid at base, fixed by their back. *Pistillate flowers:* calyx of 3 sepals. Corolla of 3 petals. Stamens rudimentary. Ovary 3-2-celled, stigmas 3-2, sessile. Drupe, by abortion simple, 1-celled, rarely 3-2-lobed, sarcocarp fibrous, stone woody. Albumen horny, hollow. Embryo at tip, vertical.

H. Thebaica, Del. *Dûm.* Gingerbread Tree. ♄ 5 to 10; trunk and branches forked, ringed. Leaves crowded at tips of branches, palmate-fan-shaped, 1 broad, the divisions 20-25, linear-lanceolate, connate to near tip, with pendulous threads at their angles; the petiole shorter than the limb, beset on either side with hooked spines. Spadix appearing among leaves, the branches resembling catkins, .1 to .15

long, .01 thick, in the staminate tree subternate; flowers pale-yellow; fruit obovate, sessile, .07 long, .05 broad, truncate, resembling a minute cocoanut, pruinose — March — 'Aqabah; Around Tôr in Arabia Petræa. The fibrous husk of the fruit is eaten by the people. It resembles gingerbread in taste.

ORDER CXV. **TYPHACEÆ,** Juss. (CAT-TAIL FAMILY).

Marsh or aquatic herbs, with linear, sessile leaves, and monœcious flowers on a spadix, or in globular heads, destitute of proper floral envelopes. The upper spikes or heads staminate, the lower pistillate. Perigonium consisting of three or more scales or bristles. Stamens 1-3, with thread-like filaments, free or connate at base. Ovary free, with a single, pendulous ovule, one style, and a simple, unilateral stigma. Nutlet with a membranous or somewhat drupaceous pericarp. Seed pendulous. Embryo linear, in the axis of the farinaceous albumen, radicle superior.

1. **TYPHA,** L. CAT-TAIL FLAG.

Spikes 2-3 on each axis, cylindrical, the upper staminate, the lower 1-2 pistillate. *Staminate spikes:* floral leaves 3-4, soon deciduous; flowers naked, 1-3-androus, subtended by numerous simple or branching hairs arising from the axis, the filaments filiform, simple or branching, the anthers 4-celled, ending in a dilated connective. *Pistillate spikes:* flowers naked, or subtended by a bracteole with a spathulate tip; ovary oblong, short-stipitate, beset at base with numerous bristles. Style filiform. Stigma linear or spathulate-ovate. Fruit a nutlet, with a long, hairy stalk, indehiscent, or dehiscent by a longitudinal slit — Tall, aquatic herbs, with a creeping, stoloniferous root-stock, cylindrical, leafy stems, and linear, leathery leaves.

* *Stigmas lanceolate-spathulate.*

1. T. latifolia, L. ♃ Broad-leaved Cat-Tail. Reed-Mace. Leaves broad-linear, *flat*, longer than flowering stalk. Spikes often close together, the pistillate brown, turning blackish; stigmas much longer than perigonial bristles — Summer — Stagnant or running water.

* * *Stigmas linear.*

2. T. angustifolia, L. ♃ Narrow-leaved Cat-Tail. Leaves linear, concave, longer than flowering stem. Spikes often remote, the pistillate brown; bracteoles filiform at base, ovate-spathulate toward tip, *as long as perigonial bristles;* stigmas much longer than perigonial bristles — Summer — Stagnant and running waters.

3. T. angustata, Bory et Chaub. ♃ Leaves narrowly linear, convex at outer, flat at inner face, longer than flowers. Spikes often remote, the pistillate pale brown, with greyish dots; bracteoles filiform at base, ovate-spathulate toward tip, about as long as linear stigmas, *much longer than perigonial bristles* — Summer — Stagnant and running waters.

2. **SPARGANIUM,** L. BUR-REED.

Flowers arranged in globular heads along the primary and second-

ary axes, the lower pistillate, the upper staminate. *Staminate flowers:* perigonium consisting of entire or bifid, membranous scales, dispersed among the stamens. Stamens about 3, with short, at length elongated filaments and two-celled anthers. *Pistillate flowers:* consisting of sessile, free or twin, 1-celled ovaries each with a perigonium of 3 pales. Style short, thick, stigma unilateral. Fruit contracted at base, deciduous with pales, indehiscent, somewhat drupe-like, with a spongy epicarp and a bony endocarp, the seed adherent to shell — Aquatic herbs.

S. ramosum, Huds. ♃ .5 to 1 or more; stem erect, branched. Leaves sword-shaped, triquetrous at base. Heads arranged in a leafy panicle, sessile or rarely peduncled; pales of perigonium nearly linear, abruptly spathulate toward tip, entire; stigma linear; fruits obpyramidal, stipitate, beaked — May — Standing water.

ORDER CXVI. AROIDEÆ. (ARUM FAMILY).

Cormous plants with acrid juice, simple or compound, often veined, leaves, and flowers crowded on a fleshy spadix, which is often surrounded by a spathe — Flowers usually monœcious and naked, occasionally perfect, and furnished with a more or less perfect perigonium. Anthers 2-celled. Ovaries free, 1-3-celled. Fruit indehiscent, (in ours) berry-like. Testa of seed leathery, usually thick. Embryo straight, in axis of albumen.

* *Leaves entire.*

1. ARISARUM. Spathe .04 to .05 long, .01 broad. Leaves sagittate, with flowers.
2. BIARUM. Spathe .06 to .2 long. Leaves linear, oblong or lanceolate, after flowers.
3. ARUM. Spathe .1 to .35 long. Leaves sagittate or hastate, before flowers.

* * *Leaves pedately dissected.*

4. HELICÒPHYLLUM. Most of the sterile stamens between the two sorts of fertile flowers.

1. ARISARUM, Targ. ARISARUM.

Spathe at length caducous, tube long, straight, closed, somewhat contracted at throat, limb curved forward, hood-like. Spadix coalesced at back with lower part of spathe, with 3-5, pistillate flowers on one side, and just above them a loose spike of staminate flowers, ending in a long, stalked, filiform or clubed-shaped appendage. *Pistillate flowers:* ovary immersed in lower part of spadix, 1-celled, ∞ -ovuled, style cylindrico-conical, stigma hemispherical, tasseled. Ovules attached to the basilar placenta by short funicles, orthotropous, erect. *Staminate flowers:* flowers monandrous, short-stalked, anther peltately attached, horseshoe-shaped, the two cells dehiscent by a continuous slit. Berries aggregated. Seeds about 6, ovoid, acute, longitudinally wrinkled, borne on an obconical funicle with a strophiole longer and thicker than funicle — Cormous herbs, with sagittate leaves appearing with flowers.

A. vulgare, Targ. ♃ Petioles slender, much longer than blade; blade ovate-cordate to sagittate, .1 long, .08 broad, obtuse or acute, auricles rounded or acute, more or less divergent. Peduncle about as long as petiole, much longer than spathe; spathe cylindrical, .06 to .07 long, white-and-red-lined, ending in a purple, ovate to

lanceolate, incurved hood; pistillate inflorescence very short; staminate thrice as long; appendix slender, curved forward above mouth, exserted and thickened at tip — December to March — Fields and stony places; coast and lower mountain regions.

Var. **Veslingii,** Boiss. Spathe longer, hood often as long as tube; appendix more exserted — Common.

2. BIARUM, Schott. Biarum.

Spathe convolute at base into an ovate or oblong tube with more or less connate margins. The pistillate flowers at base of spadix, and the staminate at tip of the lower segment, separated by a long interspace, the staminate flowers above, the spadix produced into a naked, cylindrical or club-shaped appendix. *Staminate flowers:* anthers 2 together, 2-celled, the connective somewhat elongated, dehiscent at tip by a slit or pore. *Pistillate flowers:* ovary 1-celled, 1-ovuled, tipped by a short, discoid, sessile stigma or a style; ovule sessile, basal, orthotropous; abortive stamens subulate from a thickened base above the pistils, and sometimes above the stamens; berry 1-celled, 1-seeded — Cormous herbs with ovate, oblong, lanceolate or linear leaves.

* *Stigma sessile on a conical-tapering ovary.*

1. B. Carduchorum, Schott. ♃ Leaves *spathulate-elliptical,* obtusish, .07 long, .025 broad, abruptly contracted into a petiole. Peduncle rather long; spathe .15 to .2 long, with blackish-purple, oblong-lanceolate, acuminate lamina, twice as long as narrow-cylindrical tube; appendix of spadix blackish-purple, about as long as spathe, cylindrical; pistillate inflorescence globular, staminate slender-cylindrical, twice as long as interspace — September to January — Fields and pastures; northern Syria.

* * *Ovary abruptly contracted into a style.*

2. B. Pyrami, Schott. ♃ Leaves *obovate-elliptical,* abruptly tapering into a petiole longer than blade, blade .09 long, .06 broad, obtuse, obliquely nerved. Peduncle nearly 0; spathe with inflated, scarcely connate tube, ending in a lamina four times as long, lanceolate, acuminate, blackish-purple, with the tip at length revolute; appendix of spadix blackish-purple, cylindrical, as long as spathe; pistillate inflorescence short, disk-like, staminate short-cylindrical, as long as interspace — September to January — Lake of Tiberias.

3. B. Bovei, Dec. ♃ Leaves 4-8, *oblong to oblong-elliptical,* .05 to .1 long, a little shorter than petiole. Tube of spathe connate for one-third of its length, half as long as lanceolate, acute, blackish-purple lamina; appendix of spadix somewhat shorter than spathe, cylindrical, somewhat tapering at tip; pistillate inflorescence hemispherical, staminate cylindrical-oblong, twice as long, one-third to one-half as long as interspace — September to December.

Var. **Karsaami,** Sch. Leaves ovate — Lebanon; Beilân; Aleppo.

4. B. angustatum, J. D. Hook. ♃ Leaves few, oblong-lanceolate, acute, .16 to .2 long, .035 broad, oblong-lanceolate, gradually tapering into a petiole as long as lamina. Peduncle very short, included in the oblong, acutish sheaths; spathe .14 long, with a white, oblong or inflated tube, .013 thick, ending in a dark purple, *linear-loriform lamina, about as broad as tube and five times as long;*

appendix of spadix slender, cylindrical, somewhat shorter than spathe, tapering at tip; pistillate inflorescence depressed-globular, staminate cylindrical, twice as long, a little longer than interspace — December – Central Syria.

5. B. Russelianum, Schott. ♃ Leaves 20-40, linear to oblanceolate, obtuse, glaucous below, .16 to .2 long, .005 broad. Peduncle slightly exserted from soil, as long as tube of spathe; tube of spathe ovate-oblong, connate to middle, one-half to one-third as long as oblong-lanceolate, blackish-purple lamina; appendix of spadix somewhat shorter than spathe, cylindrical-club-shaped, blackish-purple; pistillate inflorescence hemispherical, staminate short-cylindrical, a little longer, one-third as long as interspace — March and April – Aleppo to Aintâb, and eastward.

6. B. Alexandrinum, Boiss. ♃ Leaves few, linear to linear-lanceolate, .005 or less broad, tapering to a narrow petiole, with often wavy margins. Peduncle *usually longer* than spathe; spathe .03 to .06 long, dark greenish-purple, tube ovate, connate throughout, abruptly contracted into a linear lamina twice its length; appendix of spathe filiform, blackish-purple, as long as spathe or longer; pistillate inflorescence short-ovate, staminate short-cylindrical, rather loose, about as long as interspace — November to February — Said by Tristram to be found at Gennesaret. An Egyptian plant.

3. ARUM, L. Arum. *Lûf.*

Spathe broad, convolute at base into an ovate or oblong tube, ending in a concave lamina. The pistillate flowers at base of spadix, and the staminate at the tip of the lower segment; the spadix produced above the staminate flowers into a club-shaped or cylindrical, naked appendage. *Staminate flowers:* anthers 3-4 together, 2-celled, the connective often prominent, dehiscent by a short slit a little one side of tip. *Pistillate flowers:* ovary 1-celled, ∞-ovuled, stigma sessile, hemispherical. Ovules orthotropous, horizontal, attached by short funicles to the parietal placenta. Abortive stamens with a bulbous base, between the pistillate and staminate flowers, and often above the staminate. Berries 1-celled, few-seeded; seeds globular, with somewhat leathery testa, thickened and fungous at hilum — Cormous herbs, with leaves sagittate or truncate at base appearing before flowers.

Fig. 360.



Spathe and spadix of an Arum.

* *Corm rounded, with leaves and peduncle arising from its umbilicate centre.*

1. A. Dioscoridis, S. et Sm. ♃ *Lûf.* Petioles twice to thrice as long as lamina, the uppermost sheathing for two-thirds its length; lamina hastate, .25 to .35 or more long, lateral lobes oblong-triangular

Peduncle somewhat shorter than petioles; tube of spathe oblong, usually pale within, lamina four times as long, oblong-lanceolate, acuminate, purplish with *deeper brown-purple or blackish, ovate spots;* appendix of spadix somewhat shorter than spathe, blackish-violet, cylindrical to club-shaped, more or less stipitate; pistillate inflorescence twice as long as staminate; abortive stamens above the former few, above the latter numerous, purplish, setaceous from a warty base — Spring — Common in fields, roadsides, and waste places.

2. A. detruncatum, C. A. M. ♃ Petioles much shorter than lamina; lamina .2 to .25 long, oblong, obtuse, base *horizontally truncate, obsoletely cordate.* Peduncles shorter than petioles; spathe .18 to .22 long, with ovate-oblong tube, one-third as long as lanceolate-acuminate lamina; appendix of spadix club-shaped, a little shorter than spathe; pistillate inflorescence twice as long as staminate; abortive stamens above both kinds of flowers setaceous, from longitudinal areolæ separated by deep grooves — Spring.

Var. **conophalloides,** Boiss. Leaves triangular, more cordate at base; spathe green, reddish-margined; appendix of spadix violet lead color — Cedars of Lebanon.

3. A. Palæstinum, Boiss. ♃ Petioles thrice as long as lamina, .3 to .4 long, sheathing nearly to middle; leaves ovate to oblong, hastate-sagittate, lobes ovate, *obtuse.* Peduncle as long as petioles; spathe .16 to .18 long, green outside, *blackish-purple, not spotted* inside, tube *campanulate,* lamina oblong-lanceolate, *obtuse, rarely acuminate;* appendix of spadix blackish-purple, somewhat shorter than spathe, cylindrical, scarcely club-shaped; pistillate and staminate inflorescence *nearly equal in length;* abortive stamens numerous in interspace and above stamens, setaceous — Spring — Shady places; hill country of Palestine; Moab. *Sweet smelling.*

4. A. hygrophilum, Boiss. ♃ Petioles thrice as long as lamina, sheathing for their lower third; lamina hastate, lobes lanceolate, eroded at margin. Peduncle somewhat shorter than petiole; spathe .1 long, .02 broad, green, purple-margined, or purplish within, tube oblong, one-third as long as lanceolate, acuminate lamina; appendix of spathe cylindrical, two-thirds as long as lamina; abortive stamens few between rings, those above stamens separated from them by a short space, setaceous, deflexed, purple — April and May — By water; common.

Var. **rupicola,** Boiss. Peduncle somewhat longer than petioles. Leaves oblong, cordate, auricles shorter and broader, oblong-triangular, obtuse — Above Zebedâni.

5. A. Orientale, M. B. ♃ Petioles thrice to four times as long as lamina; lamina *often black-spotted,* hastate-sagittate, lobes ovate-triangular, rather obtuse. Peduncle longer than petiole; spathe with an oblong tube, half to one-third as long as *more or less intensely purple or black* lamina; spadix *half* as long as spathe, the stalk dilated into a *club-shaped,* purple appendix, longer than itself; ring of pistillate flowers twice to thrice as long as staminate; sterile stamens few, above and below fertile, setaceous — Spring.

Var. **gratum,** Engl. *Sweet smelling.* Appendix twice as long as stalk of spadix — Northern Syria; alpine Lebanon.

* * *Corm ovate-oblong, giving off the leaves and peduncle from its side.*

6. A. melanopus, Boiss. ♃ Petioles .3 long, black; lamina .16 long and broad, triangular-hastate, lateral lobes lanceolate, acutish, one-half to one-third as long as terminal. Peduncle black, much shorter than petioles; spathe .2 to .25 long, green with purple margin, tube ovate, inflated, *one-fourth to one-fifth* as long as lanceolate-acuminate lamina; spadix half to two-thirds as long as spathe, appendix brown, club-shaped, longer than stalk; ring of pistillate flowers twice as long as staminate; sterile stamens few between rings, numerous above, deflexed, long setaceous — June — Aleppo to Aintâb.

4. HELICOPHYLLUM, Schott. Helicophyllum.

Spathe convolute at base into an ovate or oblong tube, lamina concave. Stalk of spadix bearing rings of pistillate and staminate flowers, with intervening sterile stamens, and ending in a club-shaped appendix. *Staminate flowers:* anthers twin, 2-celled, the connective not elongated, the cells dehiscent by a slit toward tip. *Pistillate flowers:* ovary 1-celled, 2-ovuled. Ovules orthotropous, erect, basilar, attached by a short funicle. Sterile stamens subulate, between the staminate and pistillate flowers. Berry usually 1-seeded — Cormous herbs, with more or less dissected, hastate leaves, appearing with the flowers.

1. H. Rauwolfii, Blum. ♃ .15 to .25; lamina of leaves scarcely longer than petiole, the lowest ovate to ovate-cordate, the others hastate, *with the middle lobe oblong-lanceolate to spathulate, obtuse, the lateral much narrower and shorter, linear-lanceolate, sometimes bipartite or more or less dissected.* Peduncle shorter than petioles; spathe whitish without, tube ovate, half to one-third as long as oblong-lanceolate lamina, the latter *blackish-purple within;* spadix half as long as spathe, appendix short-stalked, obtuse, blackish-purple; interspace twice to thrice as long as pistillate ring, beset with long, sterile stamens — April — Fields; Aleppo to Aintâb, Marash, and north-eastward.

2. H. crassipes, Boiss. ♃ .2 to .4; petiole longer than lamina, *often purple-spotted,* lamina ovate in outline, pedately parted into 7-9, twisted, linear-lanceolate, lateral lobes, the intermediate segment linear-lanceolate to oblong-lanceolate. Peduncle shorter than petioles, much thickened at tip; spathe with a thick, oblong tube, open to base, whitish-green or purple-spotted without, two-thirds to one-half as long as *ovate-oblong, obtuse,* blackish-purple, *more or less spotted and warty,* lamina; spadix shorter than spathe, appendix cylindrical-club-shaped, blackish-purple; interspace twice to four times as long as pistillate ring, densely beset with sterile stamens — March to May — Fields; common.

Colocasia antiquorum, Schott, the *qalqâṣ* of the Arabs, is extensively cultivated for food.

Order CXVII. LEMNACEÆ. (Duck-Weed Family).

Minute, stemless, leafless plants, floating free on the water, consisting of a frond, producing one or a few monœcious flowers from the edge or upper surface, and commonly hanging roots from underneath; ovules rising from the base of the cell. Fruit a 1-7-*seeded utricle. Seed large, the apex*

or root-end of the seed-coat separable as a lid. Embryo straight, surrounded by albumen—Fronds solitary or 2-4 cohering, ovate-orbicular to oblong-lanceolate. *Staminate flowers* 1 or 2, consisting of a single stamen, *pistillate* consisting of a single ovary, all enclosed in a bract or minute spathe, or naked. Ovary 1-celled, 1-several-ovuled, style short, stigma concave-peltate — The simplest and smallest of flowering plants, propagated by the proliferous growth of a new individual from a cleft in the edge or base of the parent frond, remaining connected for sometime or separating; also by autumnal fronds in the form of minute bulblets, which sink to the bottom of the water, but rise and vegetate in spring.

LEMNA, L. DUCK-WEED. DUCK'S MEAT.

Fronds giving off a single rootlet from their lower surface. Flowers exserted from a fissure in the margin of the frond, enclosed in a bivalved spathe. Stamens 2, filaments thread-like, anthers 2-celled, cells with 2 cellules one above the other, transversely dehiscent. Ovary 1-6-ovuled —Plants with no spiral ducts.

L. minor, L. ♃ Fronds obovate to oblong-obovate, .003 long, a little one-sided, flat. Utricle short-urn-shaped, tipped with a short style; seed half anatropous, horizontal, parallel with the margin of the frond — Summer — Stagnant water; rarely seen in flower or fruit.

Tristram says that **Wolffia hyalina,** Del., is found in Palestine.

ORDER CXVIII. **ALISMACEÆ,** L. C. Rich. (WATER-PLANTAIN FAMILY).

Marsh herbs, with scape-like, flowering stems, and perfect or monœcious flowers, not on a spadix, consisting of a calyx, corolla, hypogynous stamens, and ovaries separate or separating at maturity, forming as many 1-2-seeded pods or akenes—Stamens 6-∞, anthers 2-celled, dehiscent lengthwise. Ovaries 3-∞, each with a style, whorled or capitate. Carpels indehiscent. Albumen 0. Embryo hooked.

1. ALISMA. Ovary 1-celled, with 1, basilar, erect ovule.

2. DAMASONIUM. Ovary 1-celled, with 2-∞ ovules, on a central placenta.

3. BUTOMUS. Ovary 1-celled, with ∞ ovules on a parietal, reticulated placenta.

4. TRIGLOCHIN. Ovaries 6, united into 1, separating at maturity, 1-celled, 1-ovuled.

1. ALISMA, L. ♃ WATER-PLANTAIN.

Flowers perfect. Sepals 3, herbaceous, persistent. Petals 3, larger than calyx, deciduous, involute in æstivation. Stamens 6, anthers attached at back of base. Ovaries numerous, implanted in a disk-like receptacle, each containing 1, erect ovule, with extrorse micropyle, lateral style and obsolete stigma. Carpels compressed, coriaceous, 1-seeded. Seed erect. Embryo hooked — Aquatics with whorled flowers in panicles.

A. Plantago, L. ♃ .5 to .8; leaves long-petioled, ovate to oblong-lanceolate, cuneate to cordate at base. Flowers on long, whorled

peduncles, forming a pyramidal panicle at the top of the scape; bracts lanceolate; petals white, orbicular, carpels obovate, obtuse, with grooved back, the ripe whorl having a funnel-shaped excavation at its centre — Summer — Marshes and water courses; general.

A leafing specimen, strongly resembling **A. natans**, L., was found by the author in a pool north of 'Ajlûn (Gilead).

2. DAMASONIUM, Juss. DAMASONIUM.

Flowers perfect. Sepals 3, herbaceous, persistent. Petals 3, larger than calyx, deciduous. Stamens 6, anthers attached by back, just above base. Ovaries 6-8, whorled, inserted on a flat, scarcely thickened receptacle, connate at base, 1-celled, 2-∞-ovuled, tapering to a short, straight style. Carpels laterally compressed, with a broad base, adnate to the receptacle, stellate-divergent, coriaceous, lanceolate, gradually tapering to a straight beak. Seeds 2 or by abortion 1. Embryo hooked — Aquatics with whorled flowers in interrupted spikes or panicles.

D. Bourgæi, Cosson. ⊙ .15 to .4; leaves long-petioled, oblong, with cuneate, truncate, or cordate base, 3-5-nerved. Scapes thickish, longer than leaves; whorls 5-20-flowered, remote or approximated, forming an interrupted spike or few-branched panicle; pedicels as long as fruits to thrice as long; petals white, rhomboid-ovate, short-clawed; carpels triquetrous-lanceolate, acute, strongly nerved nearly to tip of beak; seeds oblong-cylindrical, muriculate — April — Ditches; Acre, Ḥaifa, and southward to Egypt.

3. BUTOMUS, L. FLOWERING RUSH.

Flowers perfect. Sepals 3, persistent, somewhat colored. Petals 3, somewhat larger than petals, persistent. Stamens 9, six in pairs opposite the sepals, three opposite the petals. Ovaries 6, whorled, coherent at base, furnished at point of divergence with nectariferous pores; style persistent, obliquely beaked. Ovules crowded, parietal, nearly horizontal. Carpels coriaceous. Seeds minute, longitudinally grooved, with membranous testa. Embryo straight, cylindrical — Aquatics, with showy flowers in umbels.

B. umbellatus, L. ♃ .1 or more; root-stock horizontal. Leaves somewhat triquetrous, linear, acute. Scape cylindrical, longer than leaves; umbel terminal, many-flowered, rays .03 to .08 long; involucre of 3, lanceolate, inflated leaves; sepals and petals obovate, the latter somewhat larger, pink; open flower .02 broad — April and May — Ditches and quiet waters; common.

4. TRIGLOCHIN, L. ARROW-GRASS.

Perigonium of 6, ovate, concave, deciduous divisions, the inner 3 inserted higher up. Stamens 6, with short filaments, anthers attached under the middle of the back. Ovaries 6, connate in 1, separating at maturity, 1-ovuled, the three alternate ones sometimes sterile; styles nearly 0, stigmas short, plumose. Ovules basilar. Carpels adnate to filiform axis, at length separating from it, 1-seeded, dehiscent at length at the ventral angle. Seed erect, with thin testa — Herbs, with racemed-spiked flowers.

T. palustre, L. ♃ Root-stock short, bulb-like, covered with tunics and fibres. Leaves narrow-linear, semiterete. Scape longer than

leaves, ending in a long, slender, stiff raceme; pedicels stiff, shorter than fruits; fruit appressed to axis, linear, tapering at base, angled; carpels 3, somewhat terete, subulate, tapering-aristate at base, separating at first by lower part from axis — Summer — Marshes of the Zerqâ (Ḥaifa).

ORDER CXIX. **NAIADACEÆ,** Endl. (POND-WEED FAMILY).

Immersed aquatic plants with jointed stems and sheathing stipules within the petioles, or with sheathing bases to the leaves, inconspicuous flowers, which are naked, or with a free, scale-like calyx; the ovaries solitary, or 2-4, *distinct,* 1-*celled,* 1-*ovuled* — Flowers perfect or monœcious or diœcious. Stamens 1-4, with short filaments or 0, anthers 2-4-celled. Carpels 1-8, free, sessile, or at length pedicelled, 1-ovuled; ovule erect, pendulous, or laterally attached. Fruit consisting of membranous carpels or nutlets, or drupe-like. Albumen 0. Embryo hooked or straight — Plants, some of them growing in fresh, others in salt water.

* *Flowers spiked, perfect or polygamous.*

† *Perigonium of* 4 *divisions. Floating in fresh or brackish water.*

1. POTAMOGETON. Flowers perfect. Sepals, stamens and ovaries 4.

† † *Perigonium* 0. *Salt water plants.*

2. RUPPIA. Herbs with filiform leaves and perfect flowers. Anther cells and ovaries 4.
3. POSIDONIA. Herbs with strap-shaped leaves. Stamens 3, ovary 1.

* * *Flowers axillary, perfect, monœcious, diœcious, or polygamous.*

† *Perigonium* 0.

4. ZANNICHELLIA. Flowers monœcious, umbelled. Fresh water plants.
5. ZOSTERA. Flowers perfect, spiked, with a kind of spadix and spathe. Marine plants.
6. CYMODOCEA. Flowers diœcious, solitary, clustered, cymose; anthers equal. Marine plants.
7. HALODULE. Distinguished from the last by the inequality of the anthers. Marine plants.

† † *Perigonium hyaline.*

8. NAIAS, Monœcious or diœcious, submerged, fresh-water plants, with linear leaves.

1. POTAMOGETON, L. POND-WEED.

Flowers perfect, spiked. Perigonium herbaceous, its 4 divisions short-clawed, valvate in æstivation. Anthers 4, subsessile, attached in front of divisions, 2-celled, the cells somewhat separated. Carpels 4, erect, 1-ovuled, style short or 0, stigma peltate. Ovule attached to ventral suture below its tip, campylotropous. Nutlets 4, or by abortion 1-2, somewhat drupaceous, sessile, 1-seeded; endocarp hard, albumen 0. Embryo hooked — Plants growing in fresh or brackish water.

* *Lower leaves submerged, alternate, the floral floating, nearly opposite, dissimilar. Stipules free.*

1. P. natans, L. ♃ Stem long, nearly simple. Leaves all *long-petioled,* the submerged ones oblong to lanceolate, reduced before flowering to petioles by the decay of the lamina, the floating ones *leathery,* ovate to ovate-oblong, .05 to .15 long, more or less rounded

or cordate at base. Peduncles as thick as stems; spike dense, cylindrical, .02 to .05 long; sepals *round-rhomboid;* sides of the turgid nutlet *with a deep depression in the middle* — June — Stagnant water.

* * *All the leaves alike, submerged and alternate (except those under the peduncles which are nearly opposite), ovate or lanceolate. Stipules free.*

2. P. lucens, L. ♃ Stem branched. Leaves *membranous, pellucid, short-petioled,* cuneate at base, ovate to ovate-oblong and lanceolate, .06 to .1 long, .01 to .02 broad, serrate-roughened at margin. Peduncles thicker than stems, thickened above. Spike dense, cylindrical, .02 to .03 long; sepals transversely elliptical; nutlets obliquely elliptical, somewhat flattened, when recent with obtuse, slightly keeled margin — Summer — Lake of Yamûni.

3. P. perfoliatus, L. ♃ Stem branched. Leaves many-nerved, membranous, pellucid, *cordate-clasping at base,* ovate to ovate-lanceolate, .02 to .06 long, with roughish margins. Peduncles as thick as stems, longer than the short-cylindrical spike; sepals *short-ovate;* recent nutlets obovate, compressed, with obtuse margin — Summer — Jordan.

4. P. crispus, L. ♃ Stem forked, somewhat flattened. Leaves membranous, sessile, oblong to oblong-linear, .05 to .08 long, .005 to .01 broad, *serrulate, crisp-wavy at margin.* Peduncle as thick as stem, three to four times as long as somewhat interrupted spike; sepals ovate; nutlets ovate, compressed, ending in a slender, recurved beak nearly as long as they — Summer — Arabia Petræa; Haurân; Damascus.

Var. **Phialensis,** Post. (Bull. Herb. Boiss., I. 409.) Leaves scarcely or not at all serrulate; spikes globular to oblong, 7-20-flowered — Lake Phiala (*Birket-er-Râm*).

* * * *All the leaves submerged, grass-like, alike, and (with the exception of those subtending the peduncles, which are nearly opposite) alternate. Stipules free.*

5. P. Phialæ, Post. (Bull. Herb. Boiss., I. 409.) ♃ Stem filiform, much branched; leaves membranous, pellucid, sessile, capillary, 3-nerved, short-mucronate, .02 to .03 long, .001 broad. Peduncles longer than leaves; spike short, 2-4-flowered, interrupted; nutlets scarcely compressed, oblique, rhomboid-orbicular, *coarsely tubercled at back, mucronate at the base and apex of the inner margin* — June — Lake Phiala (*Birket-er-Râm*).

* * * * *All the leaves submerged, grass-like, alternate, the base produced into a sheath adnate to the stipule.*

6. P. pectinatus, L. ♃ Stem filiform, much branched. Leaves setaceous, obsoletely grooved, acute, 1-nerved, transversely veined. Peduncles elongated; flowers in remote, somewhat one-sided clusters, *forming long, slender, interrupted spikes;* sepals somewhat broader than long; nutlets semilunar, somewhat compressed, with obtuse back, and the inner margin straight, ending in a short beak — Summer — Birket-Buṣwâyeh (Lebanon).

* * * * * *All the leaves submerged, and opposite, the lower without stipules, the floral one or two with a stipule on one or both sides.*

7. P. densus, L. ♃ Stems cylindrical, forked. Leaves decussate, sessile, *clasping, membranous, pellucid,* elliptical to ovate-lanceolate,

more or less crowded and recurved. Spikes from forks, *nearly globular*, 2-4-flowered, with short peduncles recurved in fruit; sepals *ovate-deltoid*, acute; nutlets obovate, compressed, keeled at back, with a short, recurved beak — Summer.

Var. **lanceolatus,** Boiss. Leaves lanceolate to linear-lanceolate — The usual form in Syria.

2. RUPPIA, L. Ditch-Grass.

Flowers 2, perfect, in a spike, at first enclosed in sheaths of floral leaves. Perigonium 0. Stamens 2, with scale-like filaments, each with 2, large and separate anther-cells, diverging at base. Grains of pollen narrowly oblong, curved, dilated at either end. Ovaries 4, at first sessile, then long-pedicelled, 1-ovuled. Style 0, stigma sessile, peltate. Ovule pendulous. Carpels pyriform, often oblique, crustaceous, dehiscent by a lid as germination begins. Albumen 0 — Herbs with aspect of **Potamogeton pectinatus**, growing in salt water.

1. R. spiralis, L. ♃ *Hamûl.* Stems filiform, much branched. Leaves filiform. Peduncles *very long after flowering, spirally twisted at base;* cells of anthers oblong; carpels ovoid, oblique, erect, gradually tapering at tip, one-fourth to one-tenth as long as their stalk — April to June — Salt water and salt marshes, coast.

2. R. rostellatus, Koch. L. ♃ *Ḥenzislûd. Ḥenzalûd.* Stems filiform, much branched. Leaves filiform-setaceous. Peduncles *not elongated*, spirally twisted after flowering; cells of anther nearly globular; carpels ovoid-semilunar, tapering, oblique at tip, one-fourth to one-tenth as long as their stalk — Early summer — Beirût; near Tôr (Sinai).

3. POSIDONIA, Koenig. Posidonia.

Flowers polygamous, naked. *Perfect flowers:* stamens 3, anthers sessile, the cells separated by an ovate-lanceolate or orbicular connective; pollen confervoid, ovary ovoid, 1-ovuled; stigma sessile; fruit drupe-like, at length irregularly dehiscent; seed oblong, teretish. *Staminate flowers:* stamens 3; ovary 0 — Immersed, stout, marine herbs; root-stock thick, covered with the stumps of the withered leaves, which are ultimately resolved into fibres. Roots clustered, stout. Leaves in two rows, sheathing, equitant, with minute auricles, short ligule, and linear lamina with rounded entire tip. Scape terminal, over-topped by the last branch, and so appearing lateral. The compound spike and spikelets sheathed with large, leaf-like bracts, the uppermost flower of the spikelet staminate, the rest perfect.

P. oceanica, L. ♃ *Stenâra.* Leaves about 13, nerved. Spikelets 3-flowered; connective of anthers aristate; fruit olive-shaped — Summer — At the bottom of the sea, to a depth of 30 metres.

4. ZANNICHELLIA, L. Horned Pond-Weed.

Flowers monœcious, the staminate and pistillate close together, the staminate distinct, at length long-peduncled. *Staminate flowers:* perigonium 0; anthers (sometimes 2), the two cells adnate to the excurrent connective. *Pistillate flowers:* perigonium membranous, cup-shaped, subtending the base of the carpels. Carpels 4-8, sessile or pedicelled, oblong, flattened; style short or elongated; stigma peltate; ovule 1, suspended. Mature carpels coriaceous, dehiscent at germination into two valves. Seed oblong, with thin testa, albumen 0. Coty-

ledon long-acuminate, coiled — Slender, branching herbs growing under water, with filiform, entire leaves, and sheathing, membranous stipules.

Z. palustris, L. ♃ Carpels 2-6, crowded into a little umbel, short-peduncled, obliquely oblong or semilunar, unarmed or with dorsal or sometimes ventral margin, crenate-dentate — May and June — Water; common throughout.

Var. **genuina,** Asch. Peduncle of staminate flower longer. Fruit short-pedicelled, more or less dentate, twice to thrice as long as style; stigma denticulate.

Var. **pedicellata,** Asch. Peduncle of staminate flower shorter. Pedicels about as long as carpel; stigma obscurely denticulate.

5. ZOSTERA, L. Grass-Wrack. Eel-Grass.

Flowers perfect, naked, consisting of an anther above an ovary. Cells of anther connected by a semilunar crest, 1-3, dehiscent by longitudinal slits; pollen confervoid. Ovary spurred below, ending in a style, which is divided into two, band-like stigmas. Ovule pendulous. Fruit cylindrical, membranous, indehiscent. Embryo large — Submerged, marine herbs, with a creeping, orange-colored root-stock, rooting at nodes, the older portions soon rotting, the internodes usually curved. Branches erect, some short, sterile, others branched, fertile. Leaves two-ranked, sheathing, ligulate, the lamina linear, entire, rounded and usually notched at tip. Flowering stem flattened, inflorescence spiked, alternately 2-ranked at the anterior face of the tip of the axis (*spadix*), included in the split sheath of the uppermost floral leaf (*spathe*).

1. Z. marina, L. ♃ Stout. Sheaths of all but floral leaves *closed, destitute of auricles*, the lamina rounded or notched at tip, 3-5-9-nerved, the lateral nerves distant from margin — Spathe as broad as peduncle; flowers numerous, usually destitute of bracts; fruit longitudinally grooved — Summer — Sandy and muddy bottom of sea to a depth of 10 metres.

2. Z. nana, Roth. ♃ Slender. Sheaths of leaves *split*, 2-*auricled*, the lamina narrow-linear, entire at tip, 3-nerved, the lateral nerves at margin. Spathe much broader than peduncle; flowers 3-12, bracted; fruit not grooved — Summer — At bottom of sea, to a depth of 2 metres.

6. CYMODOCEA, Kœnig. Cymodocea.

Flowers diœcious, naked. *Staminate flowers:* anthers 2, 4-celled, inserted on a peduncle as long as they, connate, their cells splitting lengthwise, ending in a subulate beak. Pollen confervoid. *Pistillate flowers:* carpels 2, side by side, each ending in two stigmas; ovule 1, pendulous from tip of carpel, nearly orthotropous; carpel at maturity compressed, semi-ovate or semi-elliptical, bony, indehiscent. Seed free, testa separable. Embryo with a thick stalk, the radicle lateral, the cotyledon cylindrical, appressed above in the axis, enclosing in its sheath a well formed plumule — Submarine plants, with creeping root-stocks rooting at nodes, and ringed with the scars of the fallen leaves. Leaves in two rows, and, with the exception of the first leaves of the branches, frondose, their sheaths open, more or less two-auricled, produced into a strap at the base of the lamina.

* *Root-stock composed of short and long segments, with short, erect branches. Leaves linear, furnished with air-ducts. Flowers solitary at tip of branches similar to the sterile ones, or in pseudo-lateral clusters.*

1. C. nodosa, Ucria. ♃ Root-stock .002 thick, creeping on the mud. Leaf-scars forming *closed* rings; sheath cylindrical, much longer than diameter, auricled; lamina 7-nerved, denticulate above; keel of semi-ovate carpel *entire* or *repand* — Summer — Râs-Beirût.

2. C. rotundata, Ehrh. et Hempr. ♃ Root-stock .002 thick, creeping on the mud. Leaf-scars forming *closed* rings; sheath cylindrical, much longer than diameter, auricled; lamina 7-13-nerved, denticulate above; keel of carpel acutely *coarse-dentate* — Summer — Ṭôr, and probably elsewhere.

* * *Root-stock as in last. Lamina of leaves terete, obtusish at tip, appearing dorsal owing to the conspicuous auricles at tip of sheath (which is persistent after the fall of the lamina) furnished with air-ducts. Flowering branch 2-ranked below. Inflorescence spiked-cymose.*

3. C. isoetifolia. ♃ Root-stock as in last. Leaf-scars forming *open* rings; sheaths cylindrico-obconical; lamina fleshy, bright green, drying to a pale, glaucescent tint, longitudinally grooved, retuse and 3-toothed at tip — Summer — Ṭôr and 'Aqabah, and probably elsewhere.

* * * *Root-stock with long, often much branched branches, woody, terete. Lamina of leaves broad-linear, destitute of air-ducts. Inflorescence as *.*

4. C. ciliata, Forsk. ♃ *Qushr*. Branches composed of numerous, short internodes. Leaf-scars forming closed rings; sheaths obconical, at length 2-3 times as long as broad, with *small auricles;* lamina 23-25-nerved, with scarious-margined, acute teeth toward notched tip. Staminate flowers and fruits as yet unknown — Summer — Ṭôr, and probably elsewhere.

7. HALODULE, Endl. HALODULE.

As in **Cymodocea,** except that one anther is exserted as much beyond the other as the length of the latter. Carpel with one stigma — Marine plants, with slender root-stock, ringed by the prominent scars of fallen leaves. Sheaths cylindrical, 2-auricled, ligulate. Lamina linear, with 2, acute, lateral teeth at tip, and a median and 2 lateral nerves, secondary nerves obscure. Staminate flower on a rather long peduncle; pistillate with only the tips of the stigmas exserted.

H. uninervis, Forsk. ♃ Lamina scarcely produced into a rounded tip between the teeth, often tridentate by the excurrence of the median nerve — Summer — Ṭôr.

8. NAIAS, L. NAIAD.

Flowers monœcious or diœcious, solitary or clustered at the base of the branches. *Staminate flowers:* outer involucre calyptra-like, 2-4-cleft at tip, or tubular, tapering and denticulate at tip, the inner coalesced with the anther, dehiscent with it. *Pistillate flowers:* stigmas subulate, papillose along their inner face — Aquatic, submerged *annuals*, with stiff, branching, slender stems, linear, spiny-denticulate, or nearly entire, nearly opposite, leaves, which are dilated at base and obliquely decussate, the succeeding pairs winding spirally around the stem, the young leaves clustered in the axils.

1. N. minor, All. ⊙ Leaves *rigid*, recurved, spiny-dentate, *their sheaths ciliate-denticulate above*; anther, 1-celled. Seed elliptico-cylindrical—Summer—Lake Phiala (*Birket-er-Râm*).

2. N. graminea, Del. ⊙ Leaves *flaccid*, spiny-ciliate, *with a lanceolate, denticulate auricle on either side at base.* Anther 4-celled; seed ovate-oblong — Summer — Fresh water; Coast.

FIG. 361.



Axil and base of leaves of Naias graminea, with carpels magnified 3 diameters.

ORDER CXX. CYPERACEÆ, Juss. (SEDGE FAMILY).

Grass-like or rush-like herbs, with fibrous roots, mostly solid stems (culms), closed sheaths, and spiked, chiefly 3-androus flowers, one in the axil of each of the glume-like, imbricated bracts, destitute of any perigonium, or with hypogynous bristles or scales or a utricle in its place; the 1-*celled ovary with a single, erect, anatropous ovule, in fruit forming an akene* — Flowers perfect or diclinous, the glumes often in two rows. Stamens hypogynous, free, anthers attached by their base, 2-celled. Ovary free, style 1, stigmas 2-3. Akene triquetrous or flattened. Embryo minute in the base of the mealy albumen.

Spikes several to many-flowered. Flowers normally perfect and alike (rarely with stamens or pistil abortive).

† *Glumes 2-ranked.*

1. CYPERUS. Spikelets in heads or umbels. Flowers destitute of bristles.

† † *Glumes imbricated all round the rachis.*

2. HELEOCHARIS. Spikelets solitary, at end of leafless and bractless culm. Hypogynous bristles included.
3. FIMBRISTYLIS. Spikelets solitary, umbelled. Hypogynous bristles 0. Style bulbous at base.
4. SCIRPUS. Spikelets solitary, or more or less capitate, umbelled, or spiked. Style not bulbous at base.

* * *Spikes few- (usually* 1-2- *rarely* 4-6-) *flowered, often only one flower fertile, then perfect.*

5. SCHŒNUS. Rush-like plants with spikelets in terminal heads.
6. CLADIUM. Tall, reed-like plants, with large, compound-panicled inflorescence.

* * * *Flowers monœcious in the same or separate spikes on one plant, or diœcious. Pistillate flowers enclosed in a utricle.*

7. CAREX. Perennials, with spikelets solitary or arranged in a spike or panicle.

1. CYPERUS, L. GALINGALE.

Spikelets usually many-flowered, commonly arranged in an umbel or head. Glumes in 2 rows, generally keeled, all fertile, or the lower 1-3 empty. Hypogynous bristles 0. Rachis angled-flattened or acute or narrow-margined at angles, or furnished with membranous wings decurrent from the glumes. Style 2-3-cleft. Stamens 2-3, rarely 1.

Akene in the 2-stigmatose species flattened, in the 3-stigmatose triquetrous — Annual or perennial herbs, with leaves sheathing at base, sometimes reduced to simple sheaths.

* *Style bifid. Akene more or less compressed (in C. pygmæus sometimes triquetrous). Rachis not winged.*

† *Margin of akene turned toward the rachis of its spikelet. Annuals.*

1 C. flavescens, 2 globosus.

† † *Face of akene turned toward the rachis of its spikelet. Perennials or annuals.*

3 lævigatus, 4 distachyus, 5 alopecuroides, 6 pygmæus.

* * *Style trifid. Akene triquetrous.*

† *Rachis of spikelet angled or margined, not winged.*

7 C. schænoides, 8 conglomeratus, 9 fuscus, 10 eleusinoides, 11 glaber.

† † *Rachis of spikelet furnished with decurrent, membranous wings.*

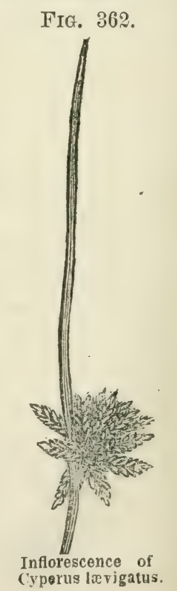
12 C. Papyrus, 13 longus, 14 rotundus, 15 esculentus.

1. C. flavescens, L. ⊙ Tufted, green; root fibrous; culms slender, obtusely 3-angled, leafy at base. Leaves linear, acuminate, somewhat shorter than culm. Spikelets oblong-lanceolate, flattened, arranged in an unequally 3-8-rayed umbel, or a globular head, sessile; leaves of involucre 2-3, unequal, much longer than spikelets; glumes imbricated, ovate, obtuse, with a green keel and 3-nerves, *pale yellow;* stamens 3; akene globular-lenticular, smooth or obsoletely wrinkled, *half* as long as glume — Summer — Coast and lower mountains.

2. C. globosus, L. ⊙ Tufted, green; root fibrous; culms slender, erect, triquetrous, leafy at base. Leaves linear, shorter than culm. Spikelets linear-oblong to oblong-lanceolate, flattened, sessile, in a few-rayed umbel or a globular head; leaves of involucre 2-3, much longer than spikelets; glumes imbricated, oblong, obtusish, with a green keel, 3-nerved, *brown toward translucent edge*, stamens 2; akenes obovate-oblong, apiculate, *one-third* as long as glume — Summer — Coast to middle mountain region, and interior plains. Too near the last.

3. C. lævigatus, L. ♃ *Faza'. Ṣammâr. Burbeit.* Root-stock horizontal, creeping; culms erect, triquetrous above, leafy at base, the lowest leaves reduced to sheaths, the limb of the upper ones linear. Spikelets *numerous*, in a globular, lateral cluster, oblong, compressed, *white;* leaves of involucre two, one forming the continuation of the culm, the other short or 0; glumes very closely imbricated, *ovate-orbicular*, obtuse; stamens 3; akene obovate, obtuse, convex on its outer, flattish on its inner aspect, half as long as glume — Spring — Sinai; el-'Arabah; coast of Palestine and Syria.

FIG. 362.



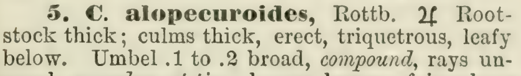
Inflorescence of Cyperus lævigatus.

FIG. 363.



Inflorescence of C. distahcyus.

4. C. distachyus, All. ♃ *Nâjîl.* Root-stock clustered, creeping; culms erect, triquetrous above, 2-3-leaved at base, the lowermost reduced to sheaths, the *upper one ending in a linear limb.* Spikelets 2-5, sessile, in a lateral cluster, linear, flattened, *blackish-brown*, often curved upward; leaves of involucre 2, one very short, the other the continuation of the culm; glumes *ovate*, obtusish; stamens 3; akenes ovate-elliptical, mucronulate, convex at outer, flattish at inner face, two-thirds as long as glume — Spring — Wet places and salt marshes; Sinai; coast of Palestine and Syria.



5. C. alopecuroides, Rottb. ♃ Root-stock thick; culms thick, erect, triquetrous, leafy below. Umbel .1 to .2 broad, *compound*, rays unequal, *corymbose at tip ;* longer leaves of involucre much longer than rays; spikelets in oblong-cylindrical, dense, crowded spikes, .01 to .02 long, .005 thick; glumes ovate-elliptical, straw-colored, with a green, mucronate keel; stigmas 2-3; akenes half as long as glume, obovate-biconvex or triquetrous — Spring — Marshes of Hûleh.

6. C. pigmæus, Rottb. ⊙ Tufted, .03 to .2; culms erect or diffuse, overtopped by linear, acuminate leaves. Spikelets numerous, oblong-lanceolate, densely crowded into a simple or compound, globular head, .005 to .01 in diameter, compressed, long-overtopped by the leaves of the involucre; glumes translucent, closely imbricated, oblong-lanceolate, 5-7-nerved, with a green, mucronate keel; stamen 1; style bifid (rarely trifid); akene oblong, tapering at both ends, smooth, with convex back and flattish face, *or, if with 3 stigmas, triquetrous*, half as long as glume — Spring — Dried marshes and sands; coast.

7. C. schænoides, Griseb. ♃ Glaucescent; root-stock long-creeping in sand; culms terete, stout, erect or incurved, base enclosed with tawny sheaths and leaves. Leaves rigid, incurved, *keeled-grooved*, as long as culm or longer. Clusters of spikelets sessile in dense, spherical heads, .02 to .035 in diameter; leaves of involucre 3-4, unequal, dilated at base, horizontal, many times as long as head; spikelets ovate-oblong, compressed, scarcely 2-ranked; glumes *chestnut-brown*, ovate, keeled, many-nerved, mucronate, the lower 1-2 larger, sterile; akene one-third as long as glume — Spring — Sands of coast.

8. C. conglomeratus, Rottb. ♃ Tufted, glaucescent; root-stock short, stoloniferous, with fibres often woolly; culms teretish, rigid, leafy at base. Leaves rigid, *teretish*, grooved below, as long as culms or shorter. Spikelets crowded into a single globular head, .01 to .03 in diameter, or crowded at the tip of a 3-4-rayed umbel, oblong to oblong-linear, compressed, many-flowered; leaves of involucre 1-3, rigid, unequal, *the longest continuing the culm*, overtopping the inflorescence; glumes *straw-colored*, ovate to ovate-oblong, keeled, obtuse or mucronulate, many-nerved; stamens 3 — Spring — Sands of coast; Arabia Petræa; southern Palestine.

9. C. fuscus, L. ⊙ Root fibrous; culms tufted, .1 to .4, erect or diffuse, triquetrous, leafy below. Leaves linear, flat, somewhat shorter than culm; inflorescence an unequally 3-7-rayed umbel, or a head; leaves of involucre 3-4, unequal, longer than inflorescence, spikelets

sessile or *pedicelled* at the end of the rays or in the head, .005 to .007 long, oblong-linear; glumes *tawny or greenish*, oblong-ovate, keeled, obtusish, mucronulate — Summer — Wet places; common.

10. C. eleusinoides, Kth. ♃ .6 to 1; root fibrous; culms stout, triquetrous, leafy below. Leaves long-sheathed, linear, flat, rigid, scabrous above. Umbel compound, contracted, rays 7-8, unequal, bearing clustered spikelets; leaves of involucre much longer than rays of involucels, not as long as spikelets; spikelets *densely spiked, linear*, 10-15-flowered; glumes loosely imbricated, keeled, oblong-elliptical, tawny, white-margined, 3-4-nerved on each side, mucronate — Summer — On the borders of the Arundo Donax jungles in Ghôr-eṣ-Ṣâfieh.

11. C. glaber, L. ⊙ Root fibrous; culms triangular-flattened, leafy below. Leaves flat, shorter than culm. Umbel often compound, rays 4-8, the central usually short or 0; spikelets crowded into ovate or spherical heads at the tip of the rays, linear-oblong; glumes ovate-oblong, *purplish, with green keel and white margin*, 3-nerved on each side, obtuse, mucronulate — Summer — Wet places; common.

12. C. Papyrus, L. Papyrus. *Babîr.* ♃ 3 to 4; root-stock stout, creeping; culms .03 to .05 thick, triquetrous above, with imbricated, brown sheaths at base, leafless or ending in a broad-lanceolate limb. Umbel nodding, .4 to .6 broad, equally many-rayed, sometimes contracted; leaves of involucre numerous, broad-lanceolate, much shorter than rays; rays slender, with a long, tubular, truncate sheath at base, and an umbellet of 2-4, unequal pedicels at tip; leaves of involucel filiform, many times longer than pedicels; spikelets scattered along the pedicels, spreading, linear, .005 to .007 long, teretish; glumes oblong, *pale fawn-colored with a green keel* — August — Marshes along coast, and about el-Ḥûleh and the Lake of Tiberias; el-Ghôr.

13. C. longus, L. ♃ .5 to 1; root-stock creeping; culms triquetrous, leafy at base. Leaves linear, rather broad, scabrous, as long as culm or shorter. Umbel compound, with many unequal rays, the pedicels of the umbellets also unequal; leaves of involucre longer than umbel; spikelets many-flowered, linear, acute, compressed, in spikes or heads at the ends of the pedicels; glumes ovate, obtuse, tawny, with a green keel, and 3-5 nerves, and a white margin — Summer — Ditches; common throughout.

14. C. rotundus, L. ♃ Trunk short; *underground stems elongated, filiform, with ovate-oblong tubers;* culm slender, triquetrous, densely leafy at base. Rays of umbel 3-9, unequal, simple or branching; longer leaves of involucre as long as rays or longer; spikelets linear, .015 to .045 long, spiked-clustered at the end of the rays; glumes *brownish-red*, ovate-oblong, obtuse or acutish, with green keel, 3-nerves, and white margins — Summer — Fields and sandy places; coast.

15. C. esculentus, L. ♃ Neck scarcely thickened; *underground* stems elongated, filiform, *with globular tubers;* culm erect, triquetrous, leafy at base. Leaves linear, usually as long as culm. Umbel compound, rays numerous, unequal, the longer often branching; leaves of involucre broad-linear, acuminate, longer than rays; spikelets spreading, *arranged in clustered spikes*, oblong to linear, .005 to .01 long; glumes loosely imbricated, ovate-oblong, obtuse, *straw-colored*, with narrow-green keel, many-nerved — Summer — Fields and sandy places; coast.

2. HELEOCHARIS, R. Br. Spike Rush.

Spikelet terminal, solitary, many-flowered, naked at base. Glumes imbricated all round the axis, the lower sometimes larger, sterile. Style terete, glabrous, thickened at base, jointed with ovary. Hypogynous bristles included. Akenes crowned with the mamillary base of the style — Herbs, with leafless sheaths.

1. H. palustris, L. ♃ Root-stock creeping; culms clustered, terete, somewhat flattened, spongy, with obliquely truncate sheaths at base. Spikelet *oblong-linear*, .01 to .02 long, acute; glumes oblong, obtuse, tawny at either side of greenish straw-colored keel, white-margined; stigmas 2; bristles 4 or less, retrorsely scabrous, somewhat longer than akene — Summer — Swampy places throughout.

Fig. 364.



Inflorescence of Heleocharis palustris.

2. H. macrantha, Böckel. ♃ Root-stock fibrous; culms erect, slender, obsoletely quadrangular; sheaths at base long, obliquely truncate. Spikelet *ovate*, obtuse, .01 long, few-flowered; glumes pale, white-margined, lanceolate, obtusish; stigmas 3; akene obovate, triquetrous, obsoletely reticulate; bristles 4, retrorsely scabrous — Summer — Natural Bridge (Lebanon).

3. FIMBRISTYLIS, Vahl. Fimbristylis.

Spikelets many-flowered, solitary, capitate or umbelled. Glumes imbricated all round the axis. Style compressed, usually hairy, bulbous-thickened at base. Hypogynous bristles 0 — Marsh plants, with spikelets in simple or compound umbels.

1. F. ferruginea, L. ② ♃ .5 to .6, tufted; culms striate, somewhat flattened. Leaves linear, grooved, sometimes reduced to a short lamina. Umbel *simple, or somewhat compound*, peduncles and pedicels unequal, longer than 1-3, unequal leaves of involucre, or shorter than the longest; spikelets *ovate*, .008 to .01 long, .004 broad; glumes ovate, keeled, *tawny to reddish*, mucronulate; akene lenticular, smooth or punctale, mucronulate — Summer — Marshy places; coast; Ghor-es-Sâfieh.

Fig. 365.



Inflorescence of Fimbristylis ferruginea.

2. F. dichotoma, Rottb. ⊙ .2; tufted, glaucescent; culms fili form, somewhat triquetrous, leafy at base. Leaves linear, acute, about as long as culm. Umbel 2-3-*compound*, with unequal peduncles and pedicels, shorter than the longer of the 3-6 leaves of involucre; spikelets *fusiform*, .004 long, .0015 broad; glumes ovate, *buff-colored* except greenish keel, mucronate; akene obovate, minute, *beautifully latticed*

with ribs and transverse striæ — Summer — Wet banks; coast; Yarmûq (Hieromax) near M-Kês; Ghor-eṣ-Ṣâfieh.

4. SCIRPUS, L. Bulrush. Club-Rush.

Spikelets many-flowered, solitary or variously grouped. Glumes nearly equal, imbricated all around axis, the lower 1-2 often sterile. Style terete, glabrous, not jointed with ovary, nor thickened at base, deciduous. Hypogynous bristles six or 0 — Herbs, with sheaths usually bearing leaves.

* *Inflorescence appearing lateral, the bract or the largest of them erect, forming the continuation of the culm.*

† *Hypogynous bristles* 0.

1. S. setaceus, L. ⊙ .05 to .1; root fibrous; culms tufted, filiform, striate. Sheaths acuminate into more or less elongated, subulate tips. Spikelets 1-3, sessile, ovate, .003 long; continuation of culm dilated at base, erect, setaceous, *usually longer than spikelets,* caducous; glumes ovate, concave, keeled, obtuse, mucronate; akenes minute, obovate, mucronulate, striate lengthwise, and sometimes transversely wavy — Summer — Sands; subalpine Lebanon.

Fig. 366.



Inflorescence of Scirpus setaceus.

2. S. Savii, Seb. et Maur. ⊙ .1 to .2; root fibrous; stems tufted. Sheaths ending in a short, subulate limb. Spikelets *solitary or twin,* ovate, .003 long; continuation of culm dilated at base, setaceous, usually *shorter than spikelet;* glumes ovate, concave, mucronate, longitudinally grooved; akenes minute, orbicular-triquetrous, minutely dotted — Summer — Moist sands; Syrian coast to middle zone of Lebanon and Cœlesyria.

3. S. supinus, L. ⊙ .1 to .2; roots fibrous; culms ascending, terete, the upper sheath ending in a subulate leaf. Spikelets ovate, .004 to .006 long, in a lateral cluster; continuation of culm erect, many times as long as cluster; glumes ovate, concave, greenish at back, tawny at sides, many-nerved, obtuse, mucronate; akenes transversely wrinkled — Summer — Sandy and marshy places; Marash, and northward.

4. S. Holoschænus, L. ♃ .5 to 1; root-stock horizontal, creeping; culms tufted, terete, striate, upper sheaths ending in a linear, semiterete, grooved, rigid leaf, usually shorter than inflorescence. Spikelets ovate, obtuse, densely crowded into spherical, sessile or peduncled, lateral heads, .08 to .1 in diameter; longest leaf of involucre much longer than inflorescence, erect, acute; glumes ovate, keeled at base, obtuse, mucronulate, ciliate; akenes ovate-triquetrous, minutely dotted — May to July — Common.

Var. **genuinus,** Boiss. Plant tall. Inflorescence compound.

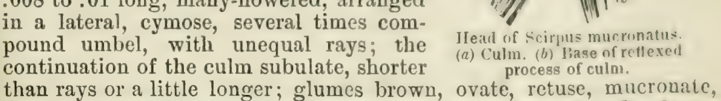
Var. **australis,** Koch. Lower. Inflorescence simple, heads smaller, sometimes only 1.

† † *Hypogynous bristles.*

5. S. mucronatus, L. ♃ .6 to .8; root fibrous; culms thick, clustered, *triquetrous,* the base with leafless, obliquely truncate sheaths. Spikelets 10-20, oblong, sessile, closely crowded *into a lateral, spherical*

head, .02 in diameter, long-overtopped by the *triquetrous, at length deflexed*, continuation of the culm; glumes longitudinally striate, *buff-colored*, ovate, concave, obtuse, mucronate, entire. Akene transversely wrinkled, mucronulate—Summer—Marshy places; Abeih (Mt. Lebanon).

FIG. 367.



Head of Scirpus mucronatus. (*a*) Culm. (*b*) Base of reflexed process of culm.

6. S. lacustris, L. ♃ 1 or more; root-stock stout, creeping; culms stout, terete, *the uppermost sheath ending in a short lamina*. Spikelets ovoid-oblong, .008 to .01 long, many-flowered, arranged in a lateral, cymose, several times compound umbel, with unequal rays; the continuation of the culm subulate, shorter than rays or a little longer; glumes brown, ovate, retuse, mucronate, the back obliquely wrinkled, the margins more or less fringed; akenes triquetrous, smooth — Summer — Marshes and ditches; coast.

7. S. littoralis, Schrad. ♃ .6 to 1; root-stock stoloniferous, fibrous; culms triquetrous, the sheaths of the young culms ending in linear-lanceolate leaves, those of older culms nearly leafless. Spikelets numerous, ovate-oblong, .006 to .008 long, in a lateral, cymose, compound umbel, with unequal rays; the continuation of the culm erect, triquetrous, longer than inflorescence; glumes ovate, brown, obtuse or retuse, mucronate; stigmas 2; *akene plano-convex* — Spring — Banks of stream near Haifa; Syria (Kth.)

* * *Inflorescence terminal, cymose-umbelled.*

8. S. maritimus, L. ♃ 1 to 2; root-stock creeping, tuberiferous; culms triquetrous, leafy. Leaves flat, keeled. Spikelets *brown or buff*, ovate-oblong, .01 to .015 long, in a terminal head, or an unequally short or long-rayed, simple or compound umbel, subtended by an involucre longer than rays; glumes ovate, *acutely bifid, with an awn in the* sinus; stigmas 3; akenes glossy, triquetrous — Summer — Ditches and swamps; common throughout.

Var. **biformis**, Post. Spikelets on the same plant, some of the typical form, and others in separate umbels cylindrical, .03 to .035 long, .005 in diameter — Ditch; Mejdel-Shems (Hermon).

* * * *Inflorescence terminal, spikelets* 3-4 *in a head without involucre, but each subtended by a bract with an awn a litlle longer than spikelet.*

FIG. 368.



Inflorescence of Scirpus Libanoticus.

9. S. Libanoticus, Post. ♃ .5; root-stock creeping; culms erect, triquetrous, leafy. Leaves flat, keeled, sheath hairy. Spikelets ovoid-oblong, .005 to .007 long, short-peduncled or sessile in a terminal head, each subtended by an ovate, obtuse, membran-

ous bract, with awn as long as or a little longer than spikelet; glumes oblong, obtuse, puberulent, aristate; stigmas 3; akenes triquetrous, glossy, one-third as long as glume — October — 'Ain-Zeḥalta (Lebanon).

* * * * *Inflorescence terminal, spikelets in a two-ranked, terminal spike, subtended by a single involucre leaf, longer than spike.*

10. S. compressus, L. ♃ .2 to .3; root-stock creeping, stoloniferous; culms compressed-terete, angled above. Leaves rather remote, linear, long-tapering, keeled below. Spikelets 6-8-flowered, spindle-shaped, .006 to .008 long, acute, crowded into an oblong spike, .02 to .03 long, .006 to .008 broad, sometimes interrupted at base; glumes nearly 4-ranked, oblong to oblong-lanceolate, brown, many-nerved; style exserted, bifid; akene ellipsoid, compressed, finely reticulated — September — Alpine Lebanon.

5. SCHÆNUS, L. Schænus.

Spikelets compressed, 2-3-flowered; flowers all fertile. Glumes nearly 2-ranked, imbricated, the lower few sterile. Perigynous bristles 3-5 or 0. Style continuous with ovary, deciduous.

S. nigricans, L. ♃ .5; tufted, root-stock horizontal; culms rigid, terete, leafy at base and surrounded there by the blackened, glossy sheaths of withered leaves. Leaves filiform, grooved, from a broad sheath, half as long as culm. Spikelets 5-10, lanceolate, compressed, 1-3-flowered, crowded into a terminal head; bracts 2, dilated at base, subulate at tip, the lower longer than head; glumes chestnut becoming blackish, lanceolate, keeled; akene white, smooth, glossy, triquetrous, — April and May — Grassy and sandy places; common.

Fig. 369.



Inflorescence of Schænus nigricans.

6. CLADIUM, R. Br. Twig-Rush.

Spikelets 1-2-flowered, in a compound panicle, one flower in each spikelet fertile. Glumes imbricated, 3-ranked, keeled, 5-6, the lower three empty; hypogynous bristles 0. Akene furnished with a crustaceous rind.

C. Mariscus, L. ♃ *Halfâ.* 1 to 2; root-stock indurated, creeping, stoloniferous; culms jointed, leafy, stout, terete, the upper segments grooved on alternate sides. Leaves linear, rigid, rough at margins and keel. Corymbs in lateral and terminal panicles, .2 to .25 broad; spikelets clustered, ovate-oblong; glumes ovate, keeled, rust-colored, the lower shorter; stamens usually 2; akene ovate, apiculate, turning black — Summer — Ditches and marshy places.

7. CAREX, L. Sedge.

Flowers monœcious or diœcious, in spikelets of one or both kinds of flowers, which are solitary at the axil of the glume. *Staminate flowers:* stamens 3, included. *Pistillate flowers:* utricle consisting of 2, connate pales or scales, contracted at tip, including the ovary. Style 1, stigmas 2-3, exserted from mouth of utricle. Akene compressed

or triquetrous, included in the growing utricle -- Perennial herbs, with spikelets solitary, or arranged in a spike or panicle. In some species the utricle encloses a small awn at the base of the ovary.

* *Spikelets androgynous, arranged in a continuous or interrupted spike, or panicled, each subtended by a bractlet. Stigmas 2.*

‡ *Spikelets staminate at tip.*

‡ *Root stoloniferous or creeping.*

1 C. stenophylla, 2 divisa.

‡ ‡ *Roots fibrous, bearing tufts.*

3 C. vulpina, 4 muricata, 5 divulsa.

† † *Spikelets staminate below.*

6 C. remota.

* * *Spikelets numerous, the terminal or upper ones staminate, the lower pistillate. If they are mixed, the pistillate flowers are more numerous.*

† *Spikelets normally either all or the upper ones androgynous at tip.*

7 C. Linkii, 8 eremitica.

† † *Spikelets normally each with only one kind of flower.*

‡ *Utricle with a short, terete, obliquely truncate or retuse beak or* 0.

9 C. glauca, 10 Mediterranea, 11 echinata, 12 maxima, 13 acuta.

‡ ‡ *Utricle with a more or less elongated, terete or compressed, bifid or bicuspid beak.*

14 C. sylvatica, 15 extensa, 16 distans, 17 paludosa, 18 riparia.

1. C. stenophylla, Wahl. ♃ .1 to .2; root-stock stoloniferous; neck fibrous. Leaves *filiform, convolute-grooved, usually curved,* shorter than culm. Spikelets 3-6, crowded into a *rounded, ovate,* or *oblong,* tawny to blackish spike, .01 to .02 long, the upper spikelets staminate; bracts *mucronate to cuspidate;* glumes ovate, obtuse or acute, white-margined; utricle ovate, plano-convex, 9-11-nerved, ending in a short beak, with serrulate-scabrous margin, and membranous, retuse mouth — Spring — Moist places, coast to middle, subalpine, and alpine regions, and interior plateaus.

Var. **planifolia,** Boiss. Leaves flat — Borders of et-Tîh; Jerusalem; Moab; Damascus and Aleppo; Syrian Desert.

2. C. divisa, Huds. ♃ *Sârad.* .2 to .6; *root-stock creeping.* Leaves firm, flat, *linear, tapering,* often as long as erect, triquetrous culm. Spike compound, ovate to oblong, .01 to .04 long, the upper spikelets staminate, all close together, or the lower separate; lower bracts *long-aristate,* sometimes as long as spike; glumes buff to tawny, keeled, acute or mucronate; utricle ovate, plano-convex, obsoletely nerved, ending in a short, bidentate beak — Spring — Moist places; common throughout; Arabia Petræa.

3. C. vulpina, L. ♃ .4 to .6; root-stock oblique. Leaves grass-like, keeled, rough, .005 to .007 broad, as long as the acutely triquetrous stems. Spike compound, .03 to .08 long, .008 to .01 thick, oblong, dense or interrupted; spikelets many-flowered, sometimes compound, *all or the lower with long, setaceous bracts;* glumes *green or*

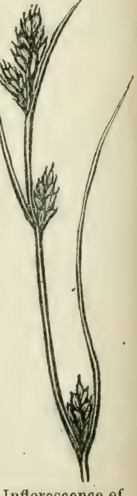
straw-colored, ovate, acute or acuminate, scarious-margined, shorter than fruit; utricles spreading, plano-convex, ovate-lanceolate, ending in a tapering, bifid beak, with rough margins — May and June — Swampy places and ditches; common.

4. C. muricata, L. ♃ .3 to .6; root-stock oblique. Leaves grassy, flat, tapering, shorter than slender, rough culms. Spike compound, oblong, dense or interrupted at base, .05 to .07 long; spikelets 6-12, *globular*, *simple*, .007 long; *bracts shorter than* spikelets; glumes ovate, acute or acuminate, *straw-colored to brown*, shorter than fruit; utricles *spreading*, plano-convex, ending in a tapering, bifid beak with rough margins — April and May — Fields and shady places; coast to middle and subalpine mountain regions, and interior plains.

5. C. divulsa, Gooden. ♃ .4 to .8; root fibrous. Leaves flat, acuminate, as long as slender, nodding culms. Spikes oblong, .05 to .08 long; spikelets globular, .005 broad, the lower somewhat separate, sometimes compound; bracts shorter than spikelet; glumes *white with a green keel*, mucronate, shorter than fruit; utricles white, *ascending*, plano-convex, obsoletely nerved, tapering into a slightly rough-margined, bifid beak — April to June — Woods and thickets; coast to middle mountain zone. Too near the last.

6. C. remota, L. ♃ .5 to .7; root fibrous. Leaves flat, *flaccid*, narrow, tapering, as long as *weak*, nodding culms. Spikelets 6-10, alternate, remote, *top-shaped or spindle-shaped*, .009 long, *the lower with very long*, *linear*, *tapering*, *leafy bracts;* glumes white, ovate, acute, shorter than fruit; utricles *erect*, somewhat flattened, elliptical, ending in a short, serrulate-scabrous, bidentate beak — June — Wet shady places; Lebanon; Amanus.

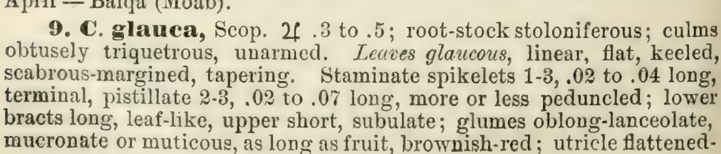
FIG. 370.



Inflorescence of Carex remota.

7. C. Linkii, Schk. ♃ .2 to .3; root-stock clustered, often thick, bearing sterile leaf-clusters and triquetrous culms leafy at base. Leaves flat, keeled, linear, long-tapering, scabrous toward tip. Spikelets 3-4, few-flowered, ovate, .01 to .015 long; bracts of lower spikelets usually longer than they; glumes ovate-lanceolate, green at back, membranous-margined; utricles oblong-triquetrous — April and May — Dry places; Alexandretta, and northward.

8. C. eremitica, Paine. ♃ .1 to .15; root-stock creeping; culms slender. Leaves linear, short, brittle. *Spikelets crowded into an ovate head*, few-flowered; bracts and glumes membranous, scarious and reddish-purple at margins; utricle a little longer than glume, rhomboid, plano-convex, reddish-black, cuspidate — April — Balqâ (Moab).



9. C. glauca, Scop. ♃ .3 to .5; root-stock stoloniferous; culms obtusely triquetrous, unarmed. *Leaves glaucous*, linear, flat, keeled, scabrous-margined, tapering. Staminate spikelets 1-3, .02 to .04 long, terminal, pistillate 2-3, .02 to .07 long, more or less peduncled; lower bracts long, leaf-like, upper short, subulate; glumes oblong-lanceolate, mucronate or muticous, as long as fruit, brownish-red; utricle flattened-

triquetrous, scabridulous, with a short, obtuse beak — April and May — Fields and moist places; common.

10. C. Mediterranea, C. B. Clark. ♃ .1 or more; root-stock creeping; culm leafy, stout, triquetrous, smooth. Leaves scabrous, the lower with broad, equitant, scarious-tawny-margined sheaths, grooved-triquetrous, recurved; stem-leaves shorter than culm. Staminate spikelets 2-3, cylindrical .03 to .035 long, with blackish brown glumes; pistillate spikelets 2-3, oblong-cylindrical, .03 to .08 long, .008 thick, bracts leaf-like, longer than spikelets; glumes oblong-lanceolate, acute, greenish at centre, dark purple at margins, much narrower than utricle, and a little longer; utricle elliptical-orbicular, triquetrous, *ciliate-margined*, *abruptly apiculate*, with a terete, truncate beak — April to June—Between Burmah and Gerash (Gilead); Lattakia.

11. C. echinata, Desf. ♃ Root-stock creeping, stoloniferous. Culms stout, obtusely angled, with tawny sheaths at base. Leaves long, rigid, broad-linear, flat, keeled, usually scabrous-margined. Spike long, spikelets 4-10, erect, long, cylindrical, dense, the upper 3-6 staminate, near together, subsessile, the rest pistillate, thicker, the lowest often peduncled; lower bracts leaf-like, much longer than spikelet, upper short; glumes linear-lanceolate, green, with tawny margins, cuspidate or muticous, *longer than fruit*; utricles erect, *densely imbricated*, obovate, scabrous or glabrous, denticulate at margin, abruptly beaked — Spring — Ditches and marshy places; coast.

12. C. maxima, Scop. ♃ 1 or more; root fibrous; culms stout, triquetrous, glabrous, leafy. Leaves linear, .007 to .009 broad, scabrous-margined. Staminate spikelet 1, rarely 2, terminal, .08 long; pistillate spikelets 3-4, distant, *curved and at length pendulous*, *resembling a catkin*, .1 to .15 long, .005 thick, more or less peduncled; lower bracts leaf-like, as long as spikelet, upper subulate, short; glumes ovate-lanceolate, *buff-colored*, mucronate, shorter than fruit; utricles elliptical, green, smooth, triquetrous, short-beaked — Summer — Moist and shady places; middle to subalpine Lebanon.

13. C. acuta, Auct. ♃ .5; root-stock stoloniferous; culms acutely triquetrous, scabrous. Leaves light green, linear, tapering, scabrous. Staminate spikelets 2-3, erect, sessile, approximated; pistillate spikelets 2-4, cylindrical, more or less peduncled, *the lower often nodding*; bracts leafy, short-2-auricled at base, the lowest longer than spikelet; glumes lanceolate, acute, *black with a white nerve*, narrower than fruit; utricles somewhat stipitate, elliptical, biconvex, with a short, slender beak — June — Marshes.

14. C. sylvatica, Huds. ♃ .5 to .7; roots fibrous; culms erect, slender, triquetrous, smooth, leafy. Leaves pale green, linear, .004 broad, rather shorter than culm. Spikelets 4-6, the terminal one (rarely two) staminate, .025 to .03 long, .003 broad; the other pistillate remote, *long-peduncled*, cylindrical, .03 to .04 long, .005 broad, loose; bracts leaf-like, *longer than spikelets*; glumes lanceolate, cuspidate, *with a green keel and whitish margins*, shorter than fruit; utricles green, ovate-triquetrous, with a beak as long as they ending in a scarious, bifid mouth — June — Galilee; Lebanon.

15. C. extensa, Good. ♃ .5 to .7; root fibrous; culms erect, glabrous, obscurely triquetrous. Leaves pale, rigid, convolute-grooved,

Staminate spikelets fusiform, .015 long; pistillate spikes 2-3, *ovate-oblong*, .008 to .012 long, dense, sessile, *crowded at the base of the staminate spikelet, the lowest sometimes a little distant, short-peduncled;* bracts leaf-like, much longer than spikelets and culm; glumes ovate, obtuse, often mucronulate, tawny, green-nerved, as long as fruit or shorter; utricle ovate, nerved, with a short, bifid, smooth-margined beak — May and June — Plains near Beersheba.

16. C. distans, L. ♃ .2 to .8; roots fibrous; culms rigid, smooth. Leaves firm, glaucescent, shorter than culm. Staminate spikelet fusiform, terminal, .02 to .03 long; pistillate spikelets 3-4, oblong, .02 to .025 long, erect, *remote, short-peduncled;* bracts sheathing at base, longer than spikelet; glume brown, ovate, obtuse, mucronate, *shorter than fruit but as broad ;* utricles ovate, obtusely triquetrous, the lateral nerves thicker, beak bifid — April to June — Wet places; common throughout.

Var. **minor,** Post. Staminate spikelets club-shaped, .01 to .015 long. Pistillate spikelets ovate to ovate-oblong, .008 to .012 long. Utricles smaller than in type — Roots of Mt. Cassius.

17. C. paludosa, Gooden. ♃ .6 to 1; root-stock creeping; culms triquetrous, scabrous at angles. Leaves linear, .01 broad, acuminate, flat, scabrous-margined. Staminate spikelets 2-8, terminal, *clustered,* cylindrical, .02 to .05 long, .006 to .008 thick; pistillate spikelets 2-3, cylindrical, .08 long, dense, remote, the upper sessile, sometimes staminate at tip, the lower short-peduncled; bracts erect, leaf-like, not sheathing, longer than spikelets; glumes *deep chestnut brown,* lanceolate, acuminate, narrower and shorter than fruit; utricles ovate-oblong, livid, flattened-triquetrous, nerved at margin, tapering into a short, bidentate beak — April to June — Ditches and swamps; between Tripoli and Hama.

18. C. riparia, Curt. ♃ 1 or more; root-stock creeping; culms stout, acutely triquetrous, scabrous at angles. Leaves linear, .008 to .01 broad, flat, keeled, tapering, as long as culm. Staminate spikelets 3-5, sessile, approximated, cylindrical, .05 to .06 long, darker than pistillate; pistillate spikes 3-4, cylindrical, .07 long, .008 to .01 thick, erect, the lower peduncled, often nodding; bracts leafy, not sheathing, several times longer than spikelets; glumes tawny, lanceolate, tapering into *a rigid many-nerved cusp, as long as fruit or longer ;* utricle yellowish-brown, ovate-conical, convex on both faces, tapering to a short, bicuspid beak — Spring — Ditches; Hems.

ORDER CXXI. GRAMINEÆ. (GRASS FAMILY).

Grasses with hollow stems (culms) closed at the joints, alternate, 2-ranked leaves, their sheaths split open on the side opposite the blade ; the hypogynous flowers imbricated with 2-ranked glumes or bracts — Flowers usually perfect, sometimes monœcious. Spikelets of one or several flowers. Lower bracts of spikelets sterile, generally two, called *glumes,* sometimes one, or many, or none; upper fertile, called *pales,* in pairs, enclosing a floweret, generally subtended by one or more minute scales, called *lodicles,* sometimes 0. Stamens

1-6, generally 3; anthers versatile, on thread-like filaments, 2-celled. Styles 2-3, free, or united at base; stigmas hairy or feathery. Ovary 1-celled, 1-ovuled, forming a seed-like grain (*caryopsis*) in fruit, which is sometimes adherent to the pales. Embryo small, on the outside of the mealy albumen — Roots fibrous. Sheath of leaves usually extended above the base of the blade into a scarious appendage (*ligule*). Spikelets panicled or spiked — A very large and important family, which furnishes a large part of the food of man and animals, and contains few injurious plants.

SERIES A. **PANICEÆ.** Spikelets jointed with pedicel below glumes. Fertile floweret 1, terminal, sometimes with a staminate or sterile one below it.

TRIBE I. **PANICEÆ.** Spikelets dorsally flattened, flowers perfect, rarely monoecious, in an open or spike-like panicle, the flowering axis not jointed. Pales not aristate, in fruit indurated.

* *Branches of panicle simple, spike-like. Pedicels jointed under each spikelet.*

1. PANICUM. ⊙ ♃ Spikelets not involucrate, nor the pedicels bristle-bearing.

2. SETARIA. ⊙ Spikelets spiked, having a one-sided involucre of bristles.

* * *Spikes or racemes simple or rarely panicled. Pedicels jointed under an involucre of 1-∞ bristles, which contains 1-3 spikelets.*

3. PENNISETUM. ♃ ⊙ Spikelets spiked, 2-flowered, surrounded by an involucre of ∞ bristles.

TRIBE II. **ORYZEÆ.** Spikelets (in ours) with one, perfect floweret, usually small, panicled or simply spiked, the flowering axis not jointed.

4. LEERSIA. ♃ Rice-like plants; spikelets in an appressed, sparingly branched panicle.

TRIBE III. **ZOYSIEÆ.** Spikelets (in ours) 2-flowered, 2-4 in a short-pedicelled cluster, the terminal sterile, the base of the cluster jointed to the continuous axis of the spiked raceme. Lower glume 0, upper minute.

5. TRAGUS. ⊙ Pale of neuter floweret 1, with 5-7, echinate ribs, and enclosing the perfect floweret.

TRIBE IV. **ANDROPOGONEÆ.** Spikelets arranged along the axis of a spike or panicle, in pairs, or the terminal in threes, compressed at back, one of the two, or the middle of the three perfect, the others staminate or neuter, rarely all fertile. Lower pale smaller than glumes, hyaline, often aristate.

* *Spikelets in a spike-like panicle, those of each pair unequally pedicelled. Branches of panicle not jointed.*

6. IMPERATA. ♃ Glumes covered at outer aspect with long, silky hairs.

* * *One spikelet of each pair or triplet sessile, the other pedicelled. Branches of panicle or axis of twin spikes more or less jointed.*

7. SACCHARUM. ♃ Tall, stout herbs, with densely silky-villous, long and narrow panicles. Lower pale of perfect flowers muticous.

8. ERIANTHUS. ♃ As in last, but lower pale of perfect floweret awned.

9. SPONDIOPOGON. ♃ Slender herbs, with hirsute inflorescence. Spikelets 3-2 on branches of panicle, 2-flowered, flowerets all perfect.

10. POLLINIA. ♃ Herbs with twin spikes. Lower pale of perfect flower long-awned.

* * * *One spikelet of each pair sessile, fertile, the other pedicelled, sterile, or 0. Spikelets appressed to the rachis, usually 2 at each hollow of the spike.*

11. ELIONURUS. ♃ Spikelets in a hirsute, cylindrical, terminal spike.

12. PHACELURUS. ♃ Spikelets 4-5-1, in loose, stiff, panicled spikes.

13. HEMARTHRIA. ♃ Spikelets appressed in stiff, linear spikes, clustered in axils of leaves, with a spathe-like sheath at base of each spike.

***** Spikelets arranged along the rachis of the spikes or branches of the panicle, one sessile, fertile, the other pedicelled, sterile. Lower pale of perfect floweret usually awned.*

14. HETEROPOGON. ♃ Spike solitary. Lower part of spike staminate or neuter, awnless, upper fertile, long-awned.

15. ANDROPOGON. ♃ Spikes solitary, twin, or digitate-clustered, or panicled. Lower as well as upper part of the spike awned, and containing perfect flowerets.

16. CHRYSOPOGON. ♃ Spikelets ternate, at tip of capillary branches of spreading panicle.

17. SORGHUM. ♃ ⊙ Spikelets in pairs along branches of open panicle.

18. ANTISTHIRIA. ♃ Spikelets in nearly capitate panicles, composed of clusters subtended by a spathe, the lower 4-8 sterile spikelets forming an involucre for the upper three fertile ones.

SERIES B. **POACEÆ.** Pedicel not jointed below glumes. Rachilla often jointed above persistent glumes, produced beyond fertile flowerets, stalk-like, bearing empty pales or rudimentary flowerets, or sometimes a perfect, terminal floweret, which, however, is separable by a joint from the sterile flowerets below it.

TRIBE V. **PHALARIDEÆ.** Spikelets laterally compressed, with 1, perfect floweret, and with or without the rudiments of two, incomplete, lower flowerets, or 3-flowered, the lower two sterile. Glumes nearly equal. Lower pale often indurated in fruit.

19. PHALARIS. ⊙ ♃ Glumes nearly equal, usually winged. Inflorescence an oblong spike or dense panicle.

20. ANTHOXANTHUM. ⊙ The lower glume half as long as the upper, not winged. Inflorescence a lanceolate, spiked panicle.

21. CRYPSIS. ⊙ Glumes nearly equal, not winged. Inflorescence a dense head or short spike, with an involucre of upper leaves.

22. CORNUCOPIÆ. ⊙ Glumes nearly equal, not winged. Inflorescence a head, with a toothed, cup-shaped involucre.

23. ALOPECURUS. ⊙ ♃ Glumes nearly equal, keeled. Inflorescence an ovate or globular head or cylindrical spike, in all but A. involucratus without involucre.

TRIBE VI. **AGROSTIDEÆ.** Spikelets 1-flowered, the axis jointed above the glumes, not produced beyond the floweret, or produced into a stalk or bristle. Styles 0 or short. Stigmas plumose, emerging from base of spikelet.

** Spikelet loosely panicled, the axis not produced beyond the floweret. Lower pale (except in Milium) awned.*

24. ARISTIDA. ♃ Lower pale 3-awned. Floweret stipitate.

25. STIPA. ♃ ⊙ Lower pale 1 awned. Floweret stipitate.

26. ARISTELLA. ♃ Lower pale 1-awned. Floweret sessile. Panicle contracted.

27. PIPTATHERUM. ♃ Lower pale 1-awned. Floweret on a short callosity. Panicle diffuse.

28. MILIUM. ⊙ Lower pale muticous. Floweret minute, sessile. Panicle diffuse.

*** Spikelets in a cylindrical or ovate to oblong spike, the axis beyond the floweret naked, or produced into a short bristle. Lower pale muticous.*

29. HELEOCHLOA. ⊙ Dwarf plants, with aspect of Crypsis, and 1-2, much dilated, open, upper sheaths subtending each spike. Glumes muticous, not recurved at tip.

30. RHIZOCEPHALUS. ⊙ Dwarf plants with tufted, ovate-oblong spikes, overtopped by leaves. Glumes muticous, recurved at tip.

31. PHLEUM. ⊙ Herbs, with aspect of Alopecurus, the cylindrical or ovate-oblong spikes long-peduncled. Glumes mucronulate to aristate.

**** Spikelets small, in a compact panicle or slender spike, the axis not produced beyond the floweret; glumes and pale not awned.*

32. SPOROBOLUS. ♃ Plants growing in maritime sands; leaves pungent, glaucous.

***** Spikelets small, more or less densely panicled, or in ovate to oblong heads. Lower pale aristate or rarely muticous.*

† *Axis not produced beyond floweret.*

33. AGROSTIS. ♃ ⊙ Panicle loose. Glumes not aristate.

34. POLYPOGON. ⊙ Panicle spike-like. Glumes aristate.

† † *Axis usually produced beyond floweret into a glabrous or hairy bristle.*

35. GASTRIDIUM. ⊙ Glumes ventricose at base, not plumose. Spikes cylindrical.

36. AMMOPHILA. ♃ Glumes membranous, firm. Panicle spike-like. Tall sea-side herbs.

37. LAGURUS. ⊙ Glumes not ventricose at base, plumose. Heads ovate to oblong.

TRIBE VII. **AVENEÆ.** Spikelets 2-∞-flowered, the terminal floweret often tabescent, usually panicled. Glumes large, almost enclosing the spikelet. Lower pale muticous, or aristate at back, upper 2-nerved or keeled.

* *Spikelets 2-flowered, the axis not produced beyond flowerets.*

38. AIRA. ⊙ Pedicels capillary, panicled. Awn not jointed or club-shaped.

* * *Spikelets 2-flowered, the axis more or less produced beyond flowerets.*

† *Lower pale with a long, dorsal awn, and bifid or 2-awned at tip.*

39. CORYNEPHORUS. ⊙ Glumes muticous. Awn of lower pale club-shaped at tip.

40. HOLCUS. ♃ ⊙ Glumes of perfect floweret muticous, of staminate mucronulate or awned. Awn of lower pale hooked or bent.

41. TRISETUM. ⊙ ♃ Spikelets small, panicles compact spike-like or loose. Caryopsis not grooved, glabrous.

42. VENTENATA. ⊙ Spikelets medium, on club-shaped pedicels (ours) in a loose panicle. Caryopsis grooved, glabrous.

43. AVENA. ⊙ ♃ Spikelets large, on capillary or thickened pedicels, panicle loose, or compact spike-like. Caryopsis grooved, hairy.

44. GAUDINIA. ⊙ Spikelets 2-ranked in excavations of axis, forming a linear spike. Caryopsis grooved, ciliate at tip.

45. ARRENATHERUM. ♃ Spikelets on capillary pedicels, panicles loose. Caryopsis teretish, pubescent.

† † *Lower pale with a terminal awn between two teeth.*

46. DANTHONIA. ♃ Spikelets in a dense, spike-like panicle. Desert plants.

TRIBE VIII. **CHLORIDEÆ.** Spikelets 1-∞-flowered, perfect, sessile, 2-ranked, along the axis of 1-sided spikes.

47. CYNODON. ♃ Weeds with digitate spikes; aspect of Panicum sanguinale.

48. TETRAPOGON. ♃ Herbs, with two, 2-ranked spikes, adhering by their inner face, thus appearing 4-ranked.

49. DACTYLOCTENIUM. ⊙ Herbs with digitate spikes, much broader than those of Cynodon dactylum.

TRIBE IX. **FESTUCEÆ.** Spikelets 2-∞-flowered, panicled or racemed, more or less pedicelled. Glumes usually shorter than lower floweret.

* *Spikelets 5-6-flowered. Lower pales ∞-nerved, 7-9-awned.*

50. PAPPOPHORUM. ⊙ Lower pale with 9 awns excurrent from nerves.

51. BOISSIERA. ⊙ Lower pale with 7-9 awns at base of hyaline tip.

* * *Spikelets 3-∞-flowered. Lower pales 3-toothed or -cleft.*

52. TRIODIA. ♃ Spikelets 1-3 in an interrupted spike, 3-5-flowered, included in glumes.

53. DIPLACHNE. ♃ Spikelets numerous, ∞-flowered, panicle long, branched.

* * * *Spikelets 2-∞-flowered, the axis under lower pales, and often the pales themselves, long-hairy.*

54. ARUNDO. ♃ Lower pale 2-cleft at tip, with an awn at sinus. All the flowerets except the uppermost fertile. Glumes equal.

55. PHRAGMITES. ♃ Lower pale acuminate-aristate. Lower floweret staminate or neuter. Glumes unequal.

* * * * *Spikelets in spikes or heads, often with an involucre of sterile glumes or spikelets.*

56. ECHINARIA. ⊙ Heads globular to ovate, .01 to .015 long, echinate with pungent awns of pales.

57. AMMOCHLOA. ⊙ Heads globular to oblong, .005 to .01 long; spikelets 2-ranked; glumes with a keel to one side.

58. SESLERIA. ♃ Alpine plants with spikelets in a cylindrical spike, .03 long.

59. LAMARCKIA. ⊙ Fertile spikelets 2-flowered, sterile oblong, .01 long, composed of obovate, obtuse, 2-ranked pales; branches of panicle and spikelets nodding, loose.

60. CYNOSURUS. ⊙ Fertile spikelets 2-5-flowered, sterile ovate to oblong, composed of 2-ranked, or somewhat spirally arranged, long-awned pales. Spikelets in ovate to oblong heads.

* * * * * *Spikelets variously panicled or spiked, or in heads, destitute of an involucre. Lower pale muticous, or awned at or beneath tip.*

61. KŒLERIA. ⊙ Spikelets in cylindrical, branched, often lobed spikes.

62. MOLINIA. ♃ Panicles long, very narrow, interrupted.

63. SPHÆNOPUS. ⊙ Panicles diffuse, with capillary, 2-3-forked branches. Pedicels club-shaped, crowned with persistent glumes.

64. CATABROSA. ♃ Aquatics, with diffuse panicles of 2-3- (rarely 1-) flowered spikelets; lower pales truncate-denticulate.

65. ERAGROSTIS. ⊙ ♃ Panicles diffuse or spiked; spikelets 3-∞-flowered, imbricated; axis and upper pales persistent; lower pales falling with caryopsis.

66. MELICA. ♃ Panicles spike-like; spikelets 2-5-flowered; the lower 1-2 fertile, the upper 1-3 consolidated into an oblong or turbinate mass.

67. ÆLUROPUS. ♃ Low plants, with rigid, 2 ranked leaves, and globular, ovate, oblong, or cylindrical spikes.

68. DACTYLIS. ♃ Spikelets in ovate to oblong, dense, compound spikes or heads,

69. SCLEROCHLOA. ⊙ Spikelets in a one-sided, spike-like panicle.

70. BRIZA. ♃ ⊙ Spikelets ovate-oblong, composed of concave, muticous, imbricated flowerets, and arranged in loose panicles with capillary branches.

71. SCHISMUS. ⊙ Spikelets in a short, dense, spike-like panicle. Lower pales 2-toothed or -lobed, with or without awn.

72. POA. ♃ ⊙ Spikelets ovate to ovate-oblong, with more or less imbricated flowerets, in more or less open panicles. Pales muticous.

73. GLYCERIA. ♃ Aquatics, with oblong-linear spikelets; flowerets imbricated. Panicles open. Glumes and pales muticous.

74. ATROPIS. ♃ Herbs with oblong spikelets, flowerets 4-6, imbricated. Panicles open. Glumes and pales muticous.

75. FESTUCA. ♃ Herbs with oblong spikelets, glumes muticous, lower pales muticous or short-awned.

76. VULPIA. ⊙ Distinguished from Festuca by long-awned pales and sometimes upper glume awned.

77. NARDURUS. ⊙ Spikelets alternate (the stalks immersed in excavations of the rachis); flowerets divergent. Lower pale muticous or short-aristate.

78. CATAPODIUM. ⊙ Spikelets nearly sessile in excavations of rachis; flowerets imbricated. Lower pale muticous.

79. SCLEROPOA. ⊙ Panicles loose, one-sided or forked. Spikelets muticous, mucronulate or aristulate.

80. BROMUS. ♃ ② ⊙ Panicles various. Spikelets ∞-flowered, large, awned.

81. BRACHYPODIUM. ♃ ⊙ Panicle reduced to a raceme of 2-ranked, more or less approximated, ∞-flowered spikelets.

TRIBE X. **HORDEÆ.** Spikelets 1-∞-flowered, sessile in excavations or at teeth of the axis of a simple spike.

* *Spikelets solitary at nodes, 3-2-∞-flowered. Spikes thick.*

† *Spikelets edgewise to axis, lodged in an excavation. Glume* 1.

82. LOLIUM. ♃ ⊙ Spikelets ∞-flowered. Glume 5-7-nerved, nerves connivent, obtuse, acute, or aristate at tip.

† † *Spikelets at teeth of axis, parallel to it. Glumes* 2.

83. AGROPYRUM. ♃ ⊙ Spikelets ∞-flowered. Glumes not subulate-aristate, nor ventricose at base. Nerves of lower pale connivent at tip.

84. HETERANTHELIUM. ⊙ Spikelets of two sorts; (1) *fertile* with 1-2, perfect flowerets, and a stalked cluster of rudimentary ones; (2) *sterile*, with only rudimentary flowerets of a single pale; all of both sorts long-aristate.

85. SECALE. ♃ Spikelets 2-flowered. Glumes lanceolate-subulate, aristate.

86. TRITICUM. ⊙ Spikelets 3-5-flowered. Glumes and lower pale ventricose at base, keeled. Nerves of lower pale not connivent at tip.

87. ÆGILOPS. ⊙ Spikelets 3-∞-flowered. Glumes and lower pale convex, not keeled, ∞-nerved, nerves not connivent at tip.

* * *Spikelets solitary at nodes,* 1-2 *flowered. Spike slender.*

88. LEPTURUS. ⊙ Spikelets 1-2-flowered. Glumes 2, of lateral spikelets placed side by side, of terminal opposite,

89. PSILURUS. ⊙ Spikelets 2-flowered. Glume 1, at outer side of spikelet, triangular, very small. Fertile floweret sessile, sterile pedicelled.

90. MONERMA. ⊙ Spikelets 1-flowered. Glumes of lateral spikelets 1, of terminal 2, opposite.

* * * *Spikelets* 2-3, *side by side at teeth of rachis. Spikes thick.*

91. HORDEUM. ♃ ⊙ Spikelets 3 at each joint, 1-flowered, with a rudiment of a second floweret, the lateral spikelet staminate or neuter, the intermediate fertile.

92. ELYMUS. ⊙ Spikelets 2 at each joint, sessile, fertile, (ours) 1-flowered, with a rudimentary second floweret.

1. PANICUM, L. Panic Grass.

Spikelets compressed at back, or inflated, not involucrate, 2-flowered, the lower staminate or neutral, the upper perfect. Glumes membranous, concave, the outer never aristate, usually much smaller, sometimes obsolete. Lower pale of lower floweret usually similar to upper glume, membranous, many-nerved; upper pale nerveless, sometimes abortive. Pales of perfect flower coriaceous, nearly equal, the lower enclosing the upper. Lodicles 2, fleshy, truncate, glabrous. Stamens 3. Ovary glabrous. Styles 2, terminal, elongated, stigmas feathery, exserted. Caryopsis enclosed in indurated pales, but free, somewhat compressed at back, with a dot-like hilum on ventral surface — Herbs with various inflorescence.

* *Spikelets arranged along one side of digitate spikes, in pairs, one sessile and one pedicelled. Lower glume small or obsolete, upper pale of neutral floweret* 0.

1. P. sanguinale, L. ⊙ *'Irq-en-Najil. Tayyin.* .3 to .8; culms ascending, often rooting below. Leaves linear-lanceolate, acute, more or less hairy. Spikes 3-8, linear, .05 to .2 long, erect, at length spreading, often reddish, spikelets oblong-lanceolate, acute; upper glume lanceolate, hairy at tip; neutral pale lanceolate, acute, 5-nerved,

hirtulous or glabrous; pales of fertile flower oblong, as long as neutral pale — Summer — Fields and waste places; common throughout.

* * *Spikelets hairy, solitary, irregularly panicled. Lower glume often* 0. *Pales of pistillate flower coriaceous.*

2. P. Teneriffæ, L. ♃ .3 to .6; root-stock indurated; culms branching at base, ascending. Leaves glaucescent, linear, rigid, convolute in drying, hairy at mouth of sheath. Panicle .08 to .1 long, spreading in flower, contracted in fruit, *branches capillary,* flexuous; spikelets oblong, *long-pedicelled;* lower glume obsolete, upper similar to lower pale of staminate floweret, membranous, ovate-lanceolate, beset with long hairs; upper pale of staminate floweret glabrous, narrower, more obtuse; fertile floweret much shorter than glume, pales oblong, *coriaceous, glossy* — April to August — Dry, stony places; el-'Arabah from Sea of Galilee to Dead Sea, and southward to Sinai and Egypt.

* * * *Spikelets in* 4 *rows or irregularly arranged on secondary spike-like branches of the panicle. Lower pale of staminate flower often aristate.*

3. P. Crus Galli, L. ⊙ *Dhuneib.* .5 to 1; culm simple or branching at neck. Leaves linear, .005 to .01 broad, flat, acuminate. Panicle terminal, contracted, .07 to .2 long; spikes sessile or short-peduncled, simple or somewhat compound, linear, erect, .03 to .04 long, usually solitary; axis of panicle at insertion of spikes and of spikes at insertion of spikelets bearded; spikelets nearly in 4 rows, hispid or scabrous, short-pedicelled oblong-ovate, acute; lower glume one-third as long as upper, muticous, upper as long as perfect floweret or longer, more or less mucronate-aristate, ciliate at nerves and margins; lower pale of lower (neutral rarely staminate) floweret similar to upper glume, but produced into a longer beard; pales of fertile floweret ovate, acute, glossy-white — Summer — Fields; common.

Var. **echinatum,** Boiss. Lower pale of neutral floweret with a very long awn — Common.

4. P. colonum, L. ⊙ *Abu-er-Rukab.* .3 to .4; culm simple or branching from base, often rooting at geniculate lower joints. Leaves erect, flat, linear-acuminate, scabrous. Panicle terminal, .05 to .1 long, *thyrsoid,* composed of simple, sessile, ascending or erect, simple, alternate or nearly opposite, oblong spikes, .01 to .02 long; axis of panicle at the insertion of lower spikes sometimes hairy; spikelets in 4 rows, on a rough axis, short-pedicelled, ovate-oblong, acute; *glumes and pales non-aristate,* the former rough with short hairs at nerves and margins, acute, the lower cordate, half as long as upper, which is as long as the staminate floweret; pales of fertile floweret as long as upper glume, white, coriaceous, acute — Summer — Fields; common from coast to middle mountain region; Ghôr-es-Şâfieh.

* * * * *Spikelets two-ranked, on the spike-like, one-sided, appressed branches of a simple, terminal panicle. Pales not aristate.*

5. P. eruciforme, S. et S. ⊙ .4; tufted; culms branched and geniculate below, ascending. Sheaths and leaves soft-pubescent, the latter lanceolate-linear, .03 long, .003 to .004 broad. Spikes linear, solitary, .01 long, short-peduncled, *appressed to axis,* forming a spike-like panicle, .06 long; spikelets crowded, short-pedicelled, ovate; lower glume small or obsolete, upper glume and lower pale of neutral floweret alike, ovate, acutish, 5-nerved, hirtulous; upper pale of neutral

floweret narrower, 2-nerved, glabrous; pales of perfect, elliptical floweret, obtuse, rather shorter than glume, coriaceous, glossy — Summer — Fields; subalpine Lebanon; Cœlesyria.

6. P. Numidianum, Lam. ♃ .6 or more; glabrous; culms stout, rooting at nodes below. Leaves linear-lanceolate, acuminate, .2 to .3 long, .012 broad. Panicle terminal, *loose*, .1 long, spikes 5-12, solitary, short-peduncled, scattered, linear, .03 to .04 long, unilateral; spikelets loosely imbricated, pedicelled, oblong, acute, green *with reddish tinge;* glumes membranous, the lower one-third as long as upper, ovate, 3-nerved, the upper similar to the lower pale of the staminate floweret, ovate, acute, 5-nerved; upper pale of staminate floweret as long but narrower; pales of fertile floweret coriaceous, white, wrinkled-punctate — Autumn — Ditches and marshes; coast.

* * * * * *Spikelets loosely and irregularly panicled. Lower glume and upper pale of perfect flower never wanting.*

7. P. repens, L. ♃ .5 to .8; root-stock creeping, stoloniferous; culms stiff, thickish below. Leaves villous or glabrescent, linear, acuminate, .004 to .005 broad, .1 to .35 long, rigid, somewhat 2-ranked, spreading, flat. Panicle terminal, somewhat compound, branches solitary or 2-3 together, capillary, flexuous; spikelets arranged in twos, loosely spiked along the branches of the panicle, pedicelled, glabrous, white, ovate-oblong, acutish; lower glume one-third as long as upper, orbicular, obtuse, nearly nerveless; upper glume and lower pale of staminate floweret alike, ovate, acute, obsoletely 5-7-nerved; pales of perfect floweret shorter, ovate, acute, coriaceous — Autumn — Moist sands; coast.

8. P. turgidum, Forsk. ♃ *Bukkâr. Thamâm. Shûsh. Abu-Rikab.* .6 to 1.5; *glabrous, glaucescent;* culms hard, *reed-like*, thickened at nodes, *proliferous*, branches clustered, *forming tangled bushes.* Leaves *of forks reduced to lanceolate, leafless sheaths*, imbricated at nodes, persistent, that of the uppermost ending often in a short, subulate lamina. Panicle terminal, .1 to .15 long, branches stiff; spikelets short-pedicelled, erect, ovate, inflated, white; glumes concave, *nearly of equal length*, acutish, with 7-9, green nerves; pales of staminate flowers alike; fertile floweret elliptical, acute, coriaceous, white, glossy — Summer — Hebron to Dead Sea, and southward to Red Sea and Sinai.

9. P. miliaceum, L. ⊙ *Dukhn.* .4 to .8; culm erect, leafy, simple or few-branched below. Leaves linear, .008 broad, flat, *hairy or hispid*, acuminate. Panicle compound, much-branched, spreading, at length nodding; spikelets oblong, acute, inflated, glabrous; glumes concave, acuminate, ∞-nerved, the lower two-thirds as long as the upper, more acute; lower pale of neutral floweret similar to upper glume; perfect floweret somewhat shorter than upper glume, ovate, coriaceous, glossy — Summer — Cultivated and subspontaneous in fields.

10. P. molle (*P. barbinode, Trin.*), Hart (Trans. Irish Royal Academy, XXVIII. 447) says that this species is found at Jericho. It has not been found by others.

2. SETARIA, P. et B. Fox-Tail Grass.

Spikelets somewhat compressed at back, having under the joint of the pedicel, a one-sided involucre consisting of bristle-like, scabrous awns, 2-flowered, the lower floweret neutral or staminate, the upper

perfect. Glumes 2, membranous, concave, muticous, the lower 3-nerved, the upper 5-7-nerved. Lower pale of lower floweret 5-7-nerved, nearly equal to perfect floweret; upper pale smaller when the lower floweret is neutral. Pales of perfect floweret coriaceous, muticous, nearly equal, the lower surrounding the upper. Lodicles 2, fleshy, truncate, glabrous. Stamens 3. Ovary glabrous. Styles 2, terminal, elongated, stigmas plumose, exserted. Caryopsis compressed at back, closely embraced by pales but free from them, the ventral surface marked with a punctiform hilum — Herbs, with the spikelets arranged in a spike-like panicle. The awns of the involucre appear to be abortive branches of the panicle or abortive pedicels.

1. S. glauca, L. ⊙ .3 to .6, ascending or erect. Leaves linear, .005 to .006 broad, acuminate, scabrous Spike cylindrical, .02 to .1 long, .01 broad; bristles of involucre 6-12, *yellow*, about thrice as long as spikelet, scabrous; glumes nearly equal, about half as long as fertile floweret; lower pale of staminate floweret ovate, as long as *transversely wrinkled* fertile floweret; upper pale of same ovate, *somewhat shorter* — Summer — Fields; coast.

2. S. viridis, L. ⊙ .3 to .6; culms erect or ascending. Leaves linear, .005 to .007 broad, acuminate, scabrous. Spike cylindrical, .02 to .1 long, .01 thick; bristles of involucre 3-6, *green or reddish*, 3-4 times as long as spikelets, scabrous; lower glume one-third as long as upper; upper glume and lower pale of neutral floweret equal, as long as the *minutely punctate-lined*, fertile floweret; upper pale of neutral floweret much shorter or 0 — Summer — Fields; common.

Var. **ambigua,** Boiss. Spike more compound, interrupted at base.

3. S. verticillata, L. ⊙ .3 to .6; culms erect or ascending. Leaves linear-acuminate, .005 to .008 broad, scabrous. Spike often more or less interrupted below; bristles of involucre 2-1, *twice* as long as spikelets, retrorsely scabrous; lower glume one-third to one-fourth as long as upper; upper glume and lower pale of neutral floweret alike, as long as minutely dotted-lined, fertile floweret; upper pale of neutral floweret much shorter or 0 — Summer — Fields; coast; Arabia Petræa.

4. S. Italica, Kth. ⊙ Millet. *Bengal Grass. Dukhn.* .6 or more; culms stout, almost reed-like. Leaves linear, acuminate, scabrous, .01 or more broad. Spike *very dense, compound*, .1 to .25 long, .015 to .02 thick, more or less interrupted; bristles of involucre 2-3, shorter than spikelet or longer, retrorsely scabrous; lower glume one-half as long as upper; upper glume and lower pale of neutral floweret alike, barely shorter than minutely dotted-lined, fertile floweret; upper pale of neutral floweret much shorter or 0 — Summer — Cultivated and run wild.

3. PENNISETUM. Pal. PENNISETUM.

Spikelets compressed at back, with an involucre of many bristles above the joint of the pedicel, deciduous with the spikelet, the outer bristles scabrous, the inner plumose. Flowerets 2, the upper perfect, the lower staminate or neutral, in which latter case it is reduced to a pale or sometimes to an awn. Glumes membranous, the lower smaller. The lower pale of each floweret acute or acuminate, enclosing the upper, which is as long but narrower. Lodicles 2, minute, or 0. Stamens

3. Ovary glabrous. Styles 2, terminal, long, more or less connate, stigmas feathery, exserted. Caryopsis oblong, flattened at back, with a dot-like hilum at base of ventral surface, enclosed in pales but free — Herbs, with 1-3 spikelets in a cluster, in simple spikes.

1. P. dichotomum. Forsk. ♃ *Hadah. Mourrât-Ghazâl. Retam.* .3 to .6; culms *rush-like*, the *lower part proliferous at nodes*, much-branched, forming a bush with aspect of *Panicum turgidum.* Sheaths of culms leafless, open, scarious, lanceolate, persistent; leaves of branches from a somewhat dilated sheath, rigid, convolute, the uppermost often forming an involucre to the spike. Spike cylindrical, .07 to .1 long, .015 to .02 in diameter, *rachis scabrous;* bristles of involucre of spikelets numerous, unequal, *white*, once and a half as long as spikelet; spikelets solitary (rarely twin), lanceolate; lower glume oblong-lanceolate, acute, 3-nerved, two-thirds as long as the upper; upper glume and lower pale of staminate floweret as long as perfect floweret, concave, 5-7-nerved, oblong-lanceolate, acute; upper pale of staminate floweret somewhat narrower and shorter; lower pale of perfect floweret mucronate-aristate — Spring — Sandy places; Arabia Petræa; 'Arabah.

FIG. 371.



Spikelet of Pennisetum dichotomum with involucre magnified 3 diameters.

2. P. elatum, Hochst. ♃ Glabrous, glaucescent; culms tall, *indurated below*, forked, beset with few, lanceolate, leafless sheaths. Leaves few, remote, sheath long, narrow, lamina short, convolute. Spike *slender*, cylindrical; *rachis bristly;* bristles of involucre *reddish*, numerous, unequal, once and a half as long as spikelet; spikelets solitary; lower glume ovate, acute, half as long as upper; upper glume somewhat longer, 3-nerved, somewhat shorter than lower pale of the lanceolate, staminate floweret — Spring — Near Naqb (Sinai).

3. P. ciliare, L. ♃ .4; tufted; culms herbaceous, decumbent-geniculate or ascending, leafy. Leaves narrowly-linear, acuminate, glabrous or hairy. Spikes cylindrical, dense, .06 to .08 long, .01 in diameter; rachis *rough;* bristles of sessile involucre numerous, *purplish to white*, unequal, the inner thicker, connate at base, plumose, once and a half to twice as long as spikelet; spikelets *twin* or solitary; glumes nearly equal, two-thirds as long as floweret, ovate-oblong, acute, 1-nerved; lower pale of staminate floweret similar to lower pale of fertile floweret, ovate-oblong, acute; upper pale of staminate floweret shorter, sometimes obsolete — April — Sandy places; Hebron; el-Ghôr and around Dead Sea, and southward to Sinai.

4. P. Orientale, Rich. ♃ .3 to .6; culms erect or ascending, branching from base. Leaves rigid, ascending, narrowly linear, acuminate, somewhat convolute, sparingly hairy, minutely scabrous to glabrous; mouth of sheath ciliate. Spikes loose or dense, .08 to .1 long, .015 to .02 broad; rachis *hairy;* pedicels short, hispid; involucre of many unequal, flexuous, reddish-violet bristles, once and a half to twice as long as spikelets, the inner scarcely thicker, plumose; lower glume ovate, 1-nerved, one-third as long as perfect floweret; upper glume ovate-lanceolate, acuminate, 3-nerved, scarcely shorter than perfect

floweret; lower pale of staminate and fertile floweret nearly alike, ovate-oblong, 5-nerved, acuminate, short-aristate; upper pale of staminate floweret bidentate — June to September — Dry rocks and hillsides; middle mountain region from Sinai to Amanus, and northward; Aintâb; Marash.

5. P. asperifolium, Desf. ♃ .3 to .6; culms stout, leafy, scabrous. Leaves long, rigid, narrowly linear, acuminate, plicate, keeled, scabrous; mouth of sheath ciliate. Spike cylindrical, .1 to .14 long, .04 *to* .05 *in diameter to tips of bristles*, dense; rachis scabrous, sparingly hairy; pedicels bristly-hispid; involucre of many, unequal, white or purplish bristles, *thrice to four times as long as* 1-2 *spikelets*, the inner somewhat connate at base, feathery; glumes hyaline, the lower ovate-triangular, acute, nearly nerveless, one-third to one-fourth as long as the upper; upper oblong-lanceolate, mucronate-aristate, 3-5-nerved; *neutral floweret* 0, *or reduced to a bristle;* lower pale oblong-lanceolate, 3-5-nerved including the bidentate upper pale — April — Rocks; coast to middle mountain zone, and interior plains; Jordan Valley; Dead Sea.

4. LEERSIA, Soland. WHITE-GRASS.

Spikelets 1-flowered, often by abortion sterile, laterally compressed. Glumes 0. Lower pale cymbiform, keeled, muticous, closed, 5-nerved, upper as long but narrower, 3-nerved. Lodicles 2, ovate, membranous. Stamens 3 or 6, rarely 0. Styles 2, terminal, feathery. Caryopsis obovate, flattened-laterally, with a linear hilum along almost the whole ventral surface, included and slightly adherent to pales — Aquatic plants, with spikelets in somewhat one-sided spikes in a thyrsoid panicle, the spikelets jointed with the slender pedicel.

L. hexandra, Sw. ♃ .4 to .8; root-stock creeping, stoloniferous; culms slender, rooting at base, then ascending. Leaves linear, narrow. Panicle few-branched, .08 long, appressed; spikelets obliquely ovate-oblong; lower pale hirtulous, rough, the keel and margins ciliate; stamens 6 — August and September — Marshes; coast.

5. TRAGUS, Hall. TRAGUS.

Spikelets dorsally compressed, 2-flowered. Lower glume 0, upper flat, membranous, minute. Lower floweret neuter, with 1, concave, 5-7-ribbed pale, enclosing the perfect floweret, the ribs echinate. Pales of perfect floweret membranous, oblong-lanceolate, the lower acute, the upper obtuse. Lodicles 2, truncate. Stamens 3. Ovary glabrous. Styles 2, terminal, separate, stigmas feathery, exserted. Caryopsis oblong, enclosed in pales but free from them, with a dot-like hilum — Spikelets 2-4, in short-pedicelled clusters, jointed to the axis and deciduous together, forming a spike-like raceme. Terminal spikelet often sterile.

FIG. 372.

Two spikelets of Tragus racemosus. 4 diameters.

T. racemosus, L. ⊙ .2 to .4; much-branched from base; culms diffuse. Leaves rigid, flat, linear, acute, margins ciliate-scabrous, the upper with elongated, somewhat inflated sheaths. Raceme .06 long; pale of neutral floweret .005 long, lanceolate, acute, echinate with hooked prickles at ribs — September — Plain of Issus.

6. IMPERATA, Cyr. Imperata.

Spikelets twin on branches of spike-like panicle, one sessile or both jointed to usually unequal pedicels, each fertile, 2-flowered, the upper floweret perfect, the lower neuter, reduced to a pale. Glumes membranous, beset with long hairs at outer face, nearly equal, muticous, longer than flowerets. Pale of neuter floweret enclosing the perfect floweret, and longer than it; pales of perfect floweret membranous, unequal, fimbriated at tip, muticous. Lodicles 0. Styles 2, terminal, elongated, connate at base, stigmas feathery, exserted. Caryopsis ovoid, glabrous, free — Perennial herbs, with a long, silky, spiked panicle.

I. cylindrica, L. ♃ .4 to .8, tufted; root-stock creeping; culms stiff, erect, surrounded at base by sheaths of dead leaves. Leaves narrowly linear, stiff, flat, at length convolute, scabrous-margined, radical numerous, cauline few. Panicle cylindrical, .08 to .15 long, .01 thick, branches appressed, short; glumes denticulate at tip; pales glabrous — May — Dry and wet sandy soil; common everywhere, even in Jordan Valley, and southward to Sinai.

7. SACCHARUM, Ræm. et Sch. Sugar Cane.

Spikelets twin at joints of the branches of a much-branched panicle, one sessile, the other pedicelled, all fertile, homogamous, 2-flowered, with a villous involucre. Glumes 2, nearly equal, membranous, longer than flowerets. Lower floweret neuter, 1-paled, or 0; upper perfect, pales membranous, muticous, unequal in breadth. Lodicles 2, 2-3-lobed. Stamens 3. Styles 2, elongated, stigmas feathery, exserted. Caryopsis free, ovate-triquetrous, with an oblong hilum — Tall herbs with a silky panicle.

S. Ægyptiacum, Willd. ♃ *Ghazzâr.* 2-3 or more; culms terete, .01 in diameter at base, solid, appressed-silky above. Leaves glaucescent, rigid, linear, .005 to .01 broad, acuminate, grooved-keeled, with a stout midrib, serrulate at margin. Panicle .5 to .6 long, .06 to .1 broad, lanceolate, axis and nearly erect branches villous-silky; base of spikelets with an involucre consisting of a ring of hairs twice as long as spikelet; glumes pale-purplish, oblong-lanceolate, acuminate, margin long-ciliate; pales shorter than glumes, with shorter ciliæ — November to January — Banks of ditches and streams; common throughout.

S. officinale, L., the Sugar Cane, is extensively cultivated.

8. ERIANTHUS, Rich. Woolly Beard-Grass.

Spikelets spiked in pairs or threes in each joint of the branches of the much-branched panicle, one sessile and the other (or 2) pedicelled, all fertile, alike, 2-flowered, with villous involucre. Glumes 2, nearly equal, longer than flowerets. Lower floweret neutral, of 1, membranous pale, enclosing the perfect floweret, and a little longer than it. Pales of perfect floweret membranous, the lower acute, produced into an awn, the upper shorter and narrower, muticous. Lodicles ovate-lanceolate, obliquely truncate. Stamens 2-3. Styles 2, terminal, elongated, stigmas feathery. Caryopsis free, oblong, with oblong, basilar hilum—Tall herbs, with thyrsoid panicle, clothed with long, silky hairs.

1. E. Ravennæ, L. ♃ 2 to 3; culms .008 to .01 thick at base, jointed, solid. Root-leaves elongated, crowded, *stem-leaves few*, all linear, channeled, with serrulate-scabrous margins and a thick midrib,

the *lower sheaths villous.* Panicle lanceolate, .4 long, .08 broad; *rachi and pedicels very hispid,* the hairs as long as the spikelets; glumes lanceolate, acuminate, more or less hispid; awn as long as lower pale — Autumn — Sandy banks of streams; coast; Lebanon; Marash; Ghôr-eṣ-Ṣâfieh.

2. E. strictus, Host. ♃ 1 to 2; culms .004 to .005 thick at base, jointed, solid. *All the leaves cauline,* elongated, linear, scabrous-margined, with a prominent, white midrib; *sheaths glabrous.* Panicle linear-lanceolate, .2 long, .02 to .03 broad, the *branches glabrous, or minutely velvety-puberulent;* spikelets surrounded at base with a ring of reddish hairs as long as they; glumes reddish, pale-scarious at tip, obtuse, 2-denticulate, the outer with ciliate margin and glabrous back, the inner glabrous; awn longer than lower pale — Autumn — Coast; middle zone of Lebanon; *Ṣôf Dagh* (Northern Syria); Antioch.

9. SPONDIOPOGON, Trin. Spondiopogon.

Spikelets three together (or by abortion 2) on the branches of the panicle, the intermediate sessile, the lateral pedicelled, all jointed, homogamous, 2-flowered. Glumes herbaceous, hirsute, somewhat longer than flowerets. Lower floweret staminate, upper perfect, and both, or only the upper, aristate. Lower pale hyaline, that of the staminate floweret lanceolate, awned or muticous, that of the perfect bifid with a twisted awn at the sinus; upper pale narrow. Styles elongated, stigmas feathery. Caryopsis free — Perennial herbs, with loose panicles.

S. pogonanthus, Boiss. ♃ .4 to .8; root-stock with stout fibres; culms branched below. Leaves linear, flat, acuminate, nearly glabrous. Panicle oblong, .08 to .1 long, .015 broad, axis flexuous, branches stiff, glabrous; pedicels of lateral spikelets hirsute; spikelets with a cluster of long hairs at base; glumes hirsute, about equal, lanceolate, mucronate; lower pale of staminate floweret lanceolate, ciliate, with an awn as long as itself or shorter; lower pale of perfect floweret bifid to middle, one-third as long as its awn — September — Banks of gullies, Plain of Issus.

10. POLLINIA, Spreng. Pollinia.

Spikelets in pairs at each joint of hairy rachis, spiked, one sessile, fertile, the other pedicillate, staminate; at the apex of the spike sometimes ternate; each 2-flowered, the lower flower reduced to a pale, neuter. *Perfect spike:* glumes 2, longer than floweret, the outer herbaceous, with scarious margin, unequally bifid, the inner hyaline, cymbiform, bifid, with a slender awn between the teeth. Pales hyaline, the lower deeply-cleft, with a long, bent and twisted awn, the upper shorter, narrower, entire. Lodicles 2, truncate, glabrous. Stamens 3. Styles 2, terminal, feathery. Caryopsis oblong. *Staminate spike:* glumes 3, herbaceous, the lowest bifid, with a slender awn, the upper two undivided. Pales hyaline, without awns, the inner much smaller, often 0 — Herbs with twin spikes.

P. distachya, L. ♃ .3 to .8, tufted; culms erect, simple. Leaves glabrous, or slightly hairy; mouths of sheaths bearded. Spikes .08 long, .005 broad excluding awns; rachis and pedicels hairy; awn of upper glume of fertile spikelet about as long as glume; of lower pale 4-5 times as long as pale — April and May — Rocky and stony places; coast to middle mountain zone; interior plains; Sinai.

11. ELIONURUS, Willd. Elionurus.

Spikelets compressed, jointed with axis, hirsute, in pairs at each hollow or at the lower hollows in threes, one or the two lateral sessile, 2-flowered, the other or middle one pedicelled, appressed to the axis, sterile. Glumes 2, somewhat coriaceous, lanceolate, concave, acuminate or somewhat caudate, ciliate at margin. Lower floweret staminate, with 1 pale, upper perfect, with 2, hyaline pales, the lower concave, the upper ciliate at keel. Stamens 3, with linear anthers. Styles 2, terminal, long; stigmas feathery. Caryopsis oblong, compressed, free, with a dot-like, basilar hilum — Herbs with the spikelets arranged in a cylindrical, hirsute spike.

Fig. 373.



Two lateral fertile, and one central sterile, spikelets of Elionurus hirsutus. 2 diameters.

E. hirsutus, Vahl. ♃ .3 to .6; root-stock indurated, furnished with stout fibres; culms erect, woody below, branching; sheaths with dilated, bearded mouth, lamina linear, acuminate, convolute. Spike .1 to .14 long, .01 broad, silvery-silky; rachis brittle; lower glume larger, sometimes bifid at tip — Spring — Sandy deserts; Arabia Petræa.

12. PHACELURUS, Griseb. Phacelurus.

Spikelets somewhat jointed with axis, compressed, a pair in each hollow, one sessile, with 2, free glumes, the other with a pedicel which is not adnate to the axis, both 2-flowered, the lower floweret staminate, the upper fertile, or in the pedicelled spikelet also staminate. Glumes coriaceous, lanceolate, one-sided, keeled. Pales membranous, lanceolate, of equal length, the lower many-nerved, the upper 2-nerved. Stamens 3, anthers elongated. Styles terminal, stigmas feathery, emerging near the base of the floweret — Perennial herbs, with spikelets in long, loose, panicled or solitary spikes.

P. digitatus, S. et Sm. ♃ 1 to 1.6; root-stock thick, branching, creeping; shoots clothed with ovate, many-nerved, imbricated scales. Leaves linear, flat, glaucous, margin scabrous, densely hairy at sheaths, especially the lower. Spikes 3-5, .15 to .3 long, in a short panicle, or 1, terminal, stiff, loose; spikelets scattered, the pedicel of the upper sometimes as long as spikelet; glumes lanceolate, acuminate, nerved — Spring — In water; Dead Sea; Marash.

13. HEMARTHRIA, R. Br. Hemarthria.

Spikelets jointed in hollows of compressed rachis, 2, one sessile, sunken, the upper glume adherent to near its tip with the rachis, the other pedicelled, the pedicel adnate to the rachis, but both glumes free; both the spikelets 1-flowered, perfect, with sometimes the lower pale of a neuter floweret. Glumes coriaceous, oblong-lanceolate, rather concave, in the sessile spikelet opposite to the rachis, in the pedicelled parallel to it; the pale of the neuter floweret, if present, and the lower pale of the perfect floweret, oblong, acute, the upper pale of the fertile floweret oblong-linear, all membranous, thin. Stamens 3, terminal, stigmas feathery. Caryopsis oblong, compressed at back, covered by the pales but free, with a dot-like hilum at base of ventral surface — A perennial herb, with spikelets appressed on linear, solitary or clustered, axillary or terminal spikes.

H. fasciculata, Desf. ♃ .3 to .8; culms ascending or decumbent, rooting at nodes. Leaves linear, acute, glabrous, channelled, keeled. Sheaths hairy at mouth. Spikes solitary or 2-6-clustered in the axils, peduncled, with a spathe-like sheath at base, straight or incurved, .07 to .14 long, .003 to .004 thick; outer glume short-lanceolate, acute — August — Wet places; coast.

14. HETEROPOGON, Pers. Heteropogon.

Spikelets 2-ranked, appressed to a simple spike, two in each joint, one sessile, the other pedicelled, all the lower spikelets staminate, destitute of an awn, the upper sessile spikelets pistillate, aristate, the pedicelled staminate or neuter, not aristate, all 2-flowered, the lower floweret neutral, reduced to a pale. *Staminate spikelets* somewhat compressed; glumes 2, of about equal length, acute, the lower membranous-coriaceous, oblique, keeled-winged, the upper narrower; pales unequal, muticous. Stamens 3. *Pistillate spikelets* teretish; glumes 2, nearly of equal length, coriaceous, rusty-hispid, the lower convolute, closely investing the upper; lower pale linear, produced into a long, bent, wavy awn; pale 0; styles 2, terminal; stigmas elongated, feathery, coming out at the tip of the spikelet; caryopsis linear-oblong — Perennial herbs with spiked inflorescence.

H. Allionii, Dec. ♃ Tufted; culms erect, compressed. Leaves linear, glabrous, flat; sheaths with bearded mouth. Spikes terminal, solitary; *rachis at the base of the staminate spikelets glabrous, at that of the pistillate hirsute; glumes of the staminate spikelets glabrous, of the pistillate tawny-hispid;* awns .04 to .06 long, pubescent below joint, scabrous above — Summer — Sunny rocks; Lebanon.

15. ANDROPOGON, L. Beard-Grass.

Spikelets in pairs at the joints of the spikes, (the terminal rarely in threes) one sessile, perfect, the other pedicelled, staminate or neuter, in which latter case it is often a mere vestige. Flowerets of fertile spikelet 2; glumes herbaceous or chartaceous, longer than floweret; the lower floweret neuter, reduced to a membranous pale or 0; lower pale of perfect floweret usually bifid at tip, short, narrow, long-awned or altogether reduced to an awn; upper pale minute or 0. Stamens 3. Styles 2, terminal. Stigmas elongated, feathery. Caryopsis oblong, free, with a dot-like hilum at the base of its ventral aspect — Perennial herbs, with spikelets imbricated in solitary or clustered, non-bracteate or bracted, spikes, the rachis more or less hairy.

Fig. 374.



Spike of Andropogon foveolatus.

* *Spikes solitary at the apex of culm or its branches, linear.*

1. A. foveolatus, Del. ♃ .3 to .4; glaucescent, tufted; root fibrous; culms erect or ascending, leafy, hirtulous at nodes, simple or branching. Leaves *sparingly ciliate at lower part of margins and mouth of sheath.* Spikes .04 to .05 long, .003 broad (without awns); spikelets 2-ranked; rachis and pedicels white-

hairy, shorter than spikelet; lower floweret of spikelets neuter, reduced to a membranous pale; glumes of perfect spikelet short-ciliate at tip, *with a pit on dorsal aspect below the tip;* lower pale reduced to a long, slender, bent and twisted awn; upper pale obsolete; pales of staminate or neuter flowerets usually 0 — April — Sandy places; Callirrhoë; 'Aqabah.

* * *Spikes numerous, terminal, clustered or digitate, not bracted.*

2. A. Ischænum, L. ♃ .3 to .5; *root-stock creeping;* culms erect, simple or sparingly branched above, *glabrous or puberulent at nodes.* Leaves glaucous, hairy at base. Spikes 3-10, digitate, linear, .04 to .06 long, *greyish*, the rachis and pedicels of staminate spikelets white-hairy; lower floweret of perfect spikelet flattened at back, reduced to a membranous pale; glumes coriaceous, the lower oblong-linear, obtusish, hairy from base to middle, ∞-nerved, the upper acute, 3-nerved; lower pale reduced to a slender, bent and twisted awn which is thrice as long as spikelet; upper pale 0; pedicelled spikelet staminate, not awned — May to August — Dry places; common.

3. A. annulatus, Forsk. ♃ *Sifân. Rukeib.* .3 to .6, tufted; *root fibrous;* culms erect or ascending, simple or branching, *long bearded at nodes.* Leaves glaucescent, glabrous or loosely hairy below. Spikes 2-8, digitate, .02 to .06 long; rachis and pedicels hairy; spikelets oblong, obtuse, flattened at back, the lower floweret reduced to a pale; glumes somewhat coriaceous, oblong-linear, ciliate at margins and sometimes at back, the lower ∞-nerved, obtuse, the upper acute, nearly nerveless; lower pale reduced to a twisted and bent, slender awn, 6 times as long as spikelet; pale 0; pedicelled spikelet staminate or neuter, not awned — Spring — Valleys around Dead Sea, and southward to Egypt; Jordan Valley. Too near the last.

* * *Spikes paniculate, each pair subtended by a spathe-like bract.*

4. A. hirtus, L. ♃ *Himâr. Namas.* .4 to 1, tufted; roots fibrous, culms branching above. Leaves scabrous at margin, glaucescent. Branches 1-3, clustered in upper axils; spikes in pairs, somewhat nodding, oblong, .02 long, .005 broad, flattened, *rachis and pedicels densely hairy*; glumes of perfect spikelets equal, obtuse, the lower ∞-nerved, densely hairy, the upper glabrous or sparsely hairy, acutish; awn geniculate, twisted, pubescent, 4-times as long as linear, 2-dentate, hyaline pale; glumes of staminate spikelet more acute; pale awnless — Spring — Dry hills; coast to middle mountain zone; common.

Var. **pubescens,** Vis. Leaves narrower; spikes fewer, more slender, with shorter appressed hairs; awn 5-6 times as long as pale — Coast; middle mountain zone; Jordan Valley; Dead Sea, and southward to Sinai.

Tristram says **A. schœnanthum,** L., is found at Gennesaret.

16. CHRYSOPOGON, Trin. Chrysopogon.

Spikelets at apex of capillary branches of panicle ternate, each 2-flowered, the lower floweret neuter, reduced to a membranous pale; the middle spikelet sessile, perfect, the lateral pedicelled, staminate. *Staminate spikelets:* glumes 2, nearly equal, longer than pale, the lower coriaceous, short-bidentate, short-aristate, the upper membranous, muticous or short-aristate. Stamens 3. *Perfect spikelet:* glumes 2, coriaceous, longer than floweret, the lower concave, acuminate, the

upper aristate. Pales membranous, the lower lanceolate, bidentate at tip, with a long, geniculate, twisted awn, the upper shorter, muticous. Stamens 3; styles 2, terminal, stigmas feathery — Perennial herbs with a loose panicle.

C. Gryllus, L. ♃ .5 to .8 or more, tufted; culms erect, simple. Leaves glaucescent, glabrous or sparingly hairy. Branches of panicle whorled, glabrous or hairy at tip; *perfect spikelet with a beard of golden hairs at base;* its lower glume with spinulose margins; upper glume with a very slender awn as long as itself; awn of lower pale many times longer than pale, hairy below; pedicels glabrous, shorter than lateral, glabrous spikelets, — April to June — Fields and dry hillsides; coast to lower mountain zones and interior plains, and northward, and eastward.

FIG. 375.

Spike of Chrysopogon Gryllus.

17. SORGHUM, L. BROOM-CORN. *Dhurah.*

Spikelets 2 or 3 together on the branches of an open panicle, one sessile, fertile, the others pedicelled, sterile, all 2-flowered, the lower floweret neuter, reduced to a pale. *Perfect spikelet:* glumes nearly equal, concave, awnless, becoming firm in fruit; lower pale of fertile floweret with a long, geniculate, twisted awn; upper pale ciliate-margined, awnless; stamens 3; styles 2, elongated; stigmas densely feathery. *Staminate spikelets:* glumes as above, pales muticous — Tall, perennial grasses, with broad, linear leaves and large, spreading panicles.

S. Halepense, L. ♃ *Hashîshet-el-Faras.* .6 to 1; root-stock creeping, furnished with suckers. Leaves often .01 broad. Panicle pyramidal, branches somewhat spreading; fertile spikelets ovate-oblong, staminate oblong-lanceolate; glumes pubescent, often reddish-purple — January to September — Fields and roadsides; common to subalpine regions. One of our most showy grasses.

S. annuum, Pers., Durra, *Dhurah-beiḍâ,* with dense, oblong-lanceolate panicles, and leaves often .04 broad, is extensively cultivated on the plains, especially toward the interior. A coarse bread is made from its seed.

18. ANTHISTIRIA, L. ANTHISTIRIA.

Spikelets 7-9-11 in clusters, condensed into a short, capitate panicle, each cluster subtended by a spathe-like leaf, the lower 4-8 spikelets of each cluster sessile, staminate or neuter, making a sort of involucre to the rest; of the upper 3 spikelets of the cluster, the lower sessile, perfect, the upper two pedicelled, staminate or neuter. Glumes muticous; those of staminate or neuter spikelets membranous or 0; lower pale of perfect floweret linear, ending in a long, twisted scabrous awn, or rarely muticous; upper pale minute or 0 — Perennials.

A. ciliata, L. ♃ .4 to .6; culms simple or branched. Leaves scabrous at nerves and margin. Peduncles filiform, nodding; glumes of the 4, sessile spikelets oblong-lanceolate, ∞-nerved, glabrous below, sparingly beset with bulbous hairs toward tip; perfect spikelet with a beard of tawny hairs at base, glumes white, the outer puberulent at

tip; terminal spikelets pedicelled, abortive, subulate — June and July — Thickets; coast to middle mountain zones.



Fig. 376.

Head of Anthistiria ciliata, the perfect flowerets having dropped out.

19. PHALARIS, L. Canary-Grass.

Spikelets crowded in a densely spiked panicle, fertile, or by abortion sterile, with one perfect, sessile floweret in each, and 1-2, neutral flowerets reduced to a linear pale. Glumes boat-shaped, keeled. Pales smaller than glumes, the lower enclosing the upper. Stamens 3. Caryopsis oblong, flattened, free — Annuals or perennials.

* *Glumes winged at back. Spikelets convex without, concave within.*

† *Annuals. Perfect flowerets villous.*

1. P. Canariensis, L. Canary Grass .3 to .6; panicle ovate to oblong, .025 to .04 long, dense; glumes white-margined, semi-ovate, wing entire; neutral flowerets 2, ciliated, *half as long as fertile* — Spring — Fields; escaped from cultivation.



Fig. 377.

Spike of Phalaris Canariensis.

2. P. brachystachys, Link. ⊙ .3 to .6; panicle ovate-oblong, .02 to .03 long, dense; glumes half-oblong, white-margined; *keel with entire wing; neutral flowerets* 2, *glabrous, many times shorter than fertile* — Spring — Fields; coast to 1500 m. Too near the last.

3. P. minor, Retz. ⊙ .15 to .3; panicle spike-like, ovate-oblong, .015 to .03 long; glumes white margined; keel *with fringed-toothed wing; sterile flower one, linear, villous, one-third to one-half as long as fertile* — Spring — Fields and waysides; coast to 1500 m.; borders of et-Tîh; interior plains; Jordan Valley.

† † *Annuals. Perfect flowerets glossy.*

4. P. paradoxa, L. ⊙ .2 to .4; panicle *cylindrical*, .03 to .05 long, .01 to .015 broad, *tapering* at base; branches with 5-6 spikelets, central spikelet of cluster only fertile, 2-4 times as long as the lateral; *the neutral spikelets on the lower branches generally rudimentary, wedge-shaped, obtuse, destitute of glumes and pales;* fertile glumes furnished with a tooth-like wing below the beak-like awn — Spring — Fields and roadsides; common.

Var. **præmorsa**, Boiss. All the spikelets except the fertile, neuter, truncate, mucronulate, wedge-shaped — Shading off to type.

† † † *Perennials. Glumes with narrow wings.*

5. P. nodosa, L. ♃ *Qurrâm. Qurreim.* .4 to .6; root-stock creeping; culms with 1-4, *oblong nodes at base.* Panicle spike-like, .05 to .08 long, oblong to cylindrical; glumes lanceolate, acute, with one nerve on each side of the green keel, and a *narrow wing near tip gradually tapering to nothing toward its base;* perfect floweret villous, half as long as glumes; neuter floweret 1, linear, *one-third to one-fourth as long as fertile floweret* — May to August — Fields; coast to middle zone of mountains, and interior plains.

* * *Glumes wingless. Perennials.*

6. P. arundinacea, L. ♃ .6 to 1.3; root-stock creeping; culms stoutish, leafy. Panicle .1 to .25 long, branched, at first somewhat spreading, then more contracted; glumes lanceolate, acuminate, two-nerved on each side and keeled; perfect floweret sparingly hairy, one-half to one-third as long as glumes; neuter flowerets 2, narrowly linear, less than half as long as fertile, hairy — June — Ditches and banks; Hamath.

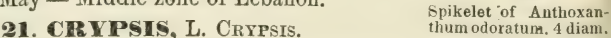
20. ANTHOXANTHUM, L. Vernal Grass.

Spikelets 3-flowered, the lower two flowerets sterile, the terminal perfect. Glumes 2, the lower half as long as upper, upper 3-nerved, as long as floweret. *Sterile flowerets* consisting of 1, hirsute, keeled, 2-nerved pale, bifid at tip, the back furnished with a twisted awn. *Perfect flowerets:* lower pale not awned, rounded, enclosing the 1-nerved, upper pale; lodicles 0; stamens 2; styles long — Annual herbs with a spike-like panicle.

Fig. 378.

A. odoratum, L. ⊙ Sweet Vernal Grass. .2 to .3; root fibrous; stems erect or ascending, slender. Panicle spike-like, lanceolate, fawn-colored, .02 to .03 long; glumes lanceolate, cuspidate, glabrous; sterile pales half as long as upper glume, the lower with a straight awn as long as lower glume, the upper with a bent awn longer than upper glume; fertile floweret shorter than sterile — April and May — Middle zone of Lebanon.

Spikelet of Anthoxanthum odoratum. 4 diam.



21. CRYPSIS, L. Crypsis.

Spikelets 1-flowered, subsessile in hemispherical to oblong heads, on a disk-shaped or short-linear axis. Glumes 2, membranous, nearly equal, somewhat shorter than floweret, with a scabrous keel. Floweret short-stalked between the glumes. Pales similar to glumes, somewhat longer, the lower 1-nerved, the upper 3-nerved. Stamens 2. Styles 2, terminal, elongated — Annual, tufted herbs, with heads subtended by an involucre of the dilated sheaths of the upper 2-4 leaves.

Fig. 379.



Heads of Crypsis aculeata.

C. aculeata, L. ⊙ .05 to .6; culms spreading on the surface of the ground and forming a flat-

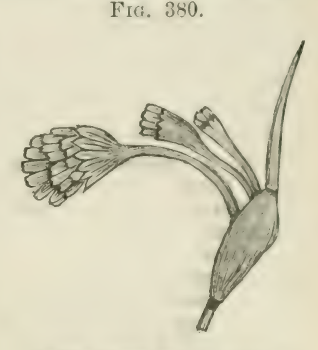
tened-hemispherical clump. Sheaths of leaves dilated, open, shorter than internodes; leaves glaucous, spreading, tapering to an awl-shaped tip. Heads .005 to .01 long — January to October — Sandy fields and somewhat moist soil; common.

22. CORNUCOPIÆ, L. Cornucopiæ.

Spikelets 1-flowered, numerous, clustered, nearly sessile, surrounded by a toothed involucre. Glumes 2, membranous, nearly equal, muticous, connate at base, keeled. Lower pale membranous, muticous, similar to glumes, scarcely longer than they; upper pale 0. Styles 2, terminal; stigma elongated.

C. cucullatum, L. ⊙ .1 to .3; culms erect or decumbent, leafy, geniculate, branched. Peduncles springing from the upper 2-3 sheaths, elongated, then thickened, and recurved; involucre funnel-shaped, 8-16-toothed, becoming indurated; spikelets obtuse, longer than involucre — Spring — Ditches, hedges, and moist fields; common.

Fig. 380.



Heads of Cornucopiæ cucullatum.

23. ALOPECURUS, L. Fox-Tail Grass.

Spikelets 1-flowered, arranged in a dense spike-like or capitate panicle. Flowerets sessile; glumes boat-shaped, strongly keeled, free, or more or less united below; lower pale scarious, nearly as long as glume, with margins often connate at base, awned at back below the middle; upper narrow or 0. Stamens 3. Styles 2, often united at base; stigmas long, feathery.

* *Annuals.*

† *Spikes destitute of a cup-shaped involucre.*

1. A. agrestis, L. ⊙ .2 to .4; culms somewhat scabrous above. Panicle *cylindrical, spiked*, .04 to .08 long, .004 to .008 thick, tapering at both ends; branches with 1-2 spikelets; glumes *united to middle, with narrowly winged keel, pubescent;* awn of the single pale arising near its base, nearly twice its length — Spring — Pastures, and moist places, and vineyards to 1300 m.

Var. **minimus**, Post. Smaller, glabrous; spikes .02 to .04 long, .002 to .003 thick. Glumes apterous — Dry places and roadsides; Beirût.

Var. **tonsus**, Blanche. Awn short, included in glumes — Fields near Tripoli; Aintâb.

2. A. utriculatus, L. ⊙ .3 to .4; culms glabrous. Panicle ovate to oblong, .01 to .02 long, .006 to .01 broad, branches with 1-2 spikelets; glumes *united to middle*, strongly flattened, *gibbous at sides, abruptly triangular-cuspidate above middle*, acute, ciliate only on keel; awn of the single pale arising near base, more than twice its length — Spring — Grassy places; possibly in northern Syria.

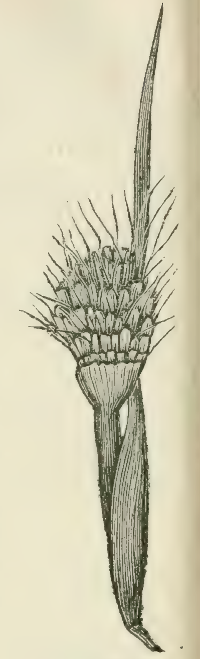
3. A. anthoxanthoides, Boiss. ⊙ .2 to .35, tufted, glabrous. Panicle *ovate-oblong*, to oblong, .02 to .035 long, .01 broad; branches with 3-4 spikelets; glumes united *for one-third their length*, lanceolate, acute, hispid at base, and along keel, narrowly winged or wingless; the single pale with jointed awn, *nearly thrice its length* — Spring — Fields and grassy places to middle and subalpine mountain zones.

Var. **alatus**, Post. Glumes with a broad wing, *abruptly truncate-toothed* below the apex; wing ciliate, tooth ciliate-fringed.

† † *Spikes with a cup-shaped involucre at base.*

4. A. involucratus, Post. (Journ. Linn. Soc., Lond., Bot. XXIV., 440). ⊙ .06 to .2; root fibrous; culms geniculate, decumbent, scabridulous. Leaves linear, scabridulous, the lower cylindrical, the upper inflated. Peduncle *club-shaped, expanded above into a cup-shaped, glabrous, scarious, paralleled-nerved involucre, one-third to one-half* as long as the ovate to oblong, .008 to .02 long, .005 to .01 broad, spike-like panicle; branches of panicle 1-flowered; glumes scarious, connate nearly to middle, ciliate, especially along keel, oblong, mucronate, wingless; the single pale a little shorter than glumes, with an awn twice its length springing from its base — Spring — Grassy places; Jaffa; Judaideh (Antilebanon); base of Jebel-Qulêb (Ḥaurân).

Fig. 381.



Head of Alopecurus involucratus.

* * *Perennials. Base of culms invested by fibrous sheaths. Root-stock creeping.*

5. A. arundinaceus, Poir. ♃ *Subbaileh.* .3 to .5; *stem leafy.* Sheaths of leaves somewhat inflated, the upper much longer than lamina. Spike *cylindrical*, .03 to .05 long, .008 broad, blunt at both ends; branches with 3-4 spikelets; glumes united for one-fourth their length, oblique at tip, acutish, long-villous, especially along the keel; single pale oblique at tip, awn included or exserted — Spring — Marshy places; subalpine Lebanon and Antilebanon; interior tablelands. Seems the same as **A. pratensis,** L.

6. A. Gerardi, Vill. ♃ .3 to .5. Stem-leaves 1-3, nearly reduced to sheaths; root-leaves linear, acuminate. Panicle spike-like, *globular to ovate*, .013 to .02 long, branches with 2-3 spikelets; glumes free, lanceolate, *obliquely tapering-aristate*, ciliate at keel; lower pale obliquely truncate, obtuse, with a straight, *included awn shorter than itself*; upper pale very narrow — Summer — Subalpine Lebanon, between Ṣannîn and Zaḥleh.

7. A. vaginatus, Willd. ♃ .3 to .5. Root-leaves linear; stem-leaves 1-2, reduced to inflated, cuspidate or short-limbed sheaths. Panicle spike-like, *ovate to ovate-oblong*, .015 to .02 long, .013 broad (excluding awns); glumes free, oblong-lanceolate, silky-hirsute, especially at keel, *more or less mucronate-awned*; lower pale obliquely

truncate, obtusish, with a geniculate, divergent, exserted awn *twice to thrice* its length; upper pale linear — May and June — Subalpine and alpine Lebanon, and Antilebanon.

24. ARISTIDA, L. Triple-Awned Grass.

Spikelets 1-flowered, somewhat laterally compressed, the floweret perfect, stipitate. Glumes membranous, lanceolate, acuminate. Pales unequal, the lower membranous, at length indurated, enclosing the slender, muticous, upper one, the awn dividing from or near base into three naked or feathery bristles. Stamens 3. Styles 2 — (Ours) perennial herbs, tufted at base, with stiff culms, geniculate below, and filiform leaves.

* *Awn persistent, divided from base into three, naked bristles.*

1. A. cærulescens, Desf. ♃ .4 to .5. Panicle .15 to .2 long, .02 broad, often interrupted at base; glumes linear-subulate, more or less unequal, purplish; lower pale stalked, somewhat longer than glumes, linear-convolute, slightly scabrous; awns capillary, .015 to .02 long, scabridulous — Spring — Rocky, dry places; coast to middle mountain zones; el-Ghôr to Sinai.

Var. **pumila,** Post. Culms .05 to .2; glumes sometimes more unequal; floweret more exserted — Coast; Dead Sea; Tiberias; southern deserts. Rather a form than a variety. (*A. pumila, Dec.*)

* * *Awn jointed, caducous, dividing above base into 3, naked bristles.*

2. A. Sieberiana, Trin. ♃ .3. Panicle narrow; glumes linear, unequal, the lower tapering-setaceous, the upper convolute, with 3 bristles at tip, the middle longer; awn of lower pale twisted, .012 long, as long as pale, then divided into three, nearly equal, naked bristles, .045 long — Spring — Palestine, near Arimathea.

* * * *Awn jointed, caducous, simple and often twisted below, dividing higher up into 3 bristles, the intermediate or all feathery.*

† *Middle bristle of awn .025 to .05 long, feathery above; the lateral bristles (except A. Forskahlei) not feathery.*

‡ *Lower pale 2-lobed at tip, the awn arising in the sinus.*

3. A. obtusa, Del. ♃ *Derêri. Sefsûf. Halfâ.* .1 to .2. Panicle close, .06 to .1 long, .02 to .035 broad; glumes nearly equal, thrice as long as floweret, lanceolate-linear, convolute, acute; awn naked to fork, the middle bristle naked below, feathery for its upper two-thirds, .02 to .025 long, twice and a half as long as the lateral — Spring — Sinai.

‡ ‡ *Lower pale not bilobed, but with a callous tip, to which the calyptriform base of the awn is jointed.*

4. A. ciliata, Desf. ♃ .3 to .5. *Nodes and ligules of leaves long-ciliated.* Panicle loose, .2 to .25 long, .05 to .06 broad; glumes glabrous, nearly equal, linear-lanceolate, obtuse; lower pale hirsute at base; awn *slightly*

Fig. 382.



Spikelet of Aristida ciliata.

exserted; middle bristle of awn .03 to .05 long, one-third naked, the rest feathery, twice to three times as long as lateral bristles — May — Es-Saisabân to Sinai, and Egypt.

5. A. plumosa, L. ♃ *Dherâri. Jebah. Sha'rêyeh. Nesî. Marghît.* .3 to .5. Sheaths of leaves and internodes tomentellous or woolly; ligule reduced to a ring of bristles. Panicle .1 to .2 long, .03 to .04 broad, loose; glumes glabrous, unequal, lanceolate, acuminate, the upper longer; lower pale *one-third* as long as glumes; awn naked; middle bristle .04 to .06 long, one-fifth naked, the rest feathery, three to five times as long as lateral bristles — May — Sands; coast and deserts.

6. A. brachypoda, Tausch. ♃ *Sefsûf.* .2 to .4; culms often tomentellous at intermediate internodes. *Sheaths of leaves glabrous;* ligule reduced to a ring of bristles. Panicle narrow, .1 to .15 long, .02 to .03 broad; glumes glabrous, linear-lanceolate, obtuse, the upper longer; lower pale hirsute at base, *one-fourth* as long as glumes, awn naked; middle bristle .03 to .05 long, one-fifth naked, the rest feathery, 2 to 4 times as long as lateral bristles—May—Sinai; Callirrhoë (Moab). Too near the last.

7. A. Forskahlei, Tausch. ♃ *Shefshûf. Sefsûf. 'Ain Sîlî. Dherêri.* .3 to .4. Sheaths of leaves glabrous; ligule reduced to a ring of hairs. Panicle linear, .1 to .15 long, .02 broad; glumes linear-lanceolate, acuminate, the lower glabrous, the upper longer, sometimes somewhat ciliate; lower pale silky, one-fourth as long as glumes, awn included, naked; *all the bristles of awn more or less feathery, or one or both of the lateral naked, the lateral two-thirds to three-fourths as long as the intermediate* — Spring to Autumn — Sandy places; Callirrhoë and southward; Beirût.

8. A. hirtigluma, Steud. ♃ .2 to .4. Sheaths of leaves bearded in place of ligule. Panicle open, .15 to .2 long, .04 broad; glumes *hirtellous,* lanceolate, obtuse, the upper longer; lower pale with a plumose base, *papillose-muricate, as well as its stalk-like appendage;* awn naked or hairy below the knee; the lateral bristles naked, one-fourth to one-third as long as the feathery middle one which is .06 to .07 long — Spring — Sinai.

† † *Awn divided near base into unequal bristles, the middle* .013 *to* .015 *long, feathery except at base and tip, the lateral naked, half as long.*

9. A. acutiflora, Trin. et Rupr. ♃ .3 to .45. Sheaths of leaves short-ciliate at mouth. Panicle elongated, contracted; glumes lanceolate, tapering-acuminate, the upper somewhat longer, 3-*denticulate at tip;* floweret short, *stalk-like appendage to lower pale long,* appressed-sericeous, ciliate at tip; the undivided part of awn .003 long, naked, *not geniculate;* middle bristle .013 to .015 long, naked below, *feathery at middle, naked toward tip,* the lateral bristles setaceous, naked, half as long — Spring — Arabia Petræa.

25. STIPA, L. Feather-Grass.

Spikelets 1-flowered, laterally compressed, the perfect floweret stipitate. Glumes membranous, lanceolate, subulate-acuminate, longer than flowerets. Pales coriaceous, at length indurated, the lower convolute, enclosing the upper, with a callous spur at base, and jointed at tip to a twisted, geniculate, usually very long, single awn. Stamens 3, rarely fewer, anthers usually bearded at tip. Styles 2-3, short, stig-

mas feathery — Tufted perennials or annuals, with convolute, rigid, filiform leaves, usually curved.

* *Awn glabrous, or appressed-puberulent.*

1. S. parviflora, Desf. ♃ .3 to .8; *culms nearly naked*. Panicle *diffuse*, .15 to .2 long; glumes hyaline-membranous, unequal, the lower tapering into an awn .01 to .015 long; lower pale hairy at base, appressed-hirsute at tip, awn .03 to .1, capillary, puberulent-scabridulous, geniculate at first quarter of its length, twisted below knee — May — Rocky places; mountains near Qaryetein (Syrian Desert); Damascus Plateau, and southward to Sinai and Egypt.

2. S. tortilis, Desf. ☉ *Sefsûf*. .2 to .4; culms *leafy*. Panicle .1 long, *contracted, the dilated sheath of upper leaf forming an involucre;* glumes nearly equal, .012 long, longer than floweret, linear-lanceolate, tapering into a cusp shorter than they; lower pale *with an acute spur at base*, appressed-pubescent, awn .06 to .1 long, once or twice geniculate and much twisted and appressed-hairy below middle, scabrous and straight or twisted above — March to May — Sands and dry places; coast to middle mountain zone; Jordan Valley, and southward to Sinai. A noxious weed, the sharp spur of the lower pale insinuating itself into the meshes of garments, and the fleece of sheep, and working its way into the skin, the stiff hairs making its withdrawal difficult.

Fig. 383.

Floweret of Stipa tortilis.

3. S. Lagascæ, R. et Sch. ♃ .5 to 1; root fibrous; culms sparingly leafy. Panicle erect, .3 long, loose; glumes hyaline, equal, linear-lanceolate, tapering-aristate, .02 to .03 long; lower pale linear-lanceolate, pubescent in lines or all round below, silky at truncate tip; awn .15 to .2 long, appressed-puberulent — March and April — Borders of et-Tîh to Moab, Ḥaurân, Damascus, Aleppo, Ṣôf Dagh, and northward; Jaffa.

* * *Awn feathery above knee or throughout. Root fibrous. Culms leafy.*

4. S. barbata, Desf. ♃ .3 to .5. Panicle few-flowered, .2 long, narrow; glumes about equal, hyaline, linear-lanceolate, tapering-aristate, .02 to .03 long; lower pale oblong-lanceolate, truncate, appressed-hairy at base and along one line, and at tip, otherwise glabrous; awn .1 to .15 long, geniculate at lower fourth or third — April to June — Sinai; Lebanon and Antilebanon; Damascus; Kurd Dagh; Palmyrene Desert.

26. ARISTELLA, Bertol. Aristella.

Spikelets 1-flowered, somewhat laterally compressed, the perfect floweret sessile, jointed at base. Glumes membranous, nearly equal. Lower pale coriaceous, involute, bidentate a little below its tip, awn straight, jointed at base; upper pale shorter, obtusely 2-keeled. Stamens 3, with glabrous anthers. Styles 2, short, with feathery stigmas — Perennial with aspect of Stipa.

A. bromoides, L. ♃ .5 to .7, tufted; root-fibrous; culms slender, rigid. Leaves long, convolute, filiform, smooth. Panicle *linear*, .1 to .15 long, .005 broad, loose, interrupted at base, branches 2-3 together,

short, appressed to axis; glumes light-colored, lanceolate, acuminate, .008 to .01 long, 3-nerved; lower pale somewhat shorter than glumes, appressed-hirsute, with a scabrous awn twice to twice and a half its length — Summer — Lower and middle zones of Lebanon.

27. PIPTATHERUM, P. B. Piptatherum.

Spikelets 1-flowered, somewhat flattened, borne on short, obconical pedicels, all fertile. Glumes nearly equal, membranous, concave, longer than pale; pales caducous, scarious, the lower concave, embracing the 2-nerved upper one, ending in a jointed, deciduous, not twisted awn. Stamens 3. Styles 2, short, stigmas feathery. Caryopsis ovate-oblong — Perennials, with panicled spikelets.

1. P. miliaceum, L. ♃ *Miknaseh-barrîyeh. Zibl-Abu-Ḥusein. Ḥimâr.* .1 or more; ligule short. Panicle .3 to .5 long, .15 to .2 broad, much-branched, *verticillate, contracted in fruit;* spikelets .004 to .005 long, including awn; glumes green, lanceolate; lower pale *glabrous, half as long as awn* — April to July — Bushy places and hedges; common.

2. P. holciforme, M. B. ♃ *Zaqqâmat-el-'aṣfûr.* .5 to .8. Ligule elongated. Panicle .2 long, loose, with *twin,* flaccid branches, *spreading or nodding in fruit;* spikelets .01 long, without awn; glumes light-colored, or bluish below, 5-nerved at base, ovate-lanceolate; lower pale *appressed-hairy, one-third to one-half as long as slightly exserted awn* — April to June — Rocky places; common.

Fig. 384.

Seed

Tip of branch of panicle of Piptatherum holciforme.

Var. **Blancheanum,** Boiss. Pales glabrous, glossy — Lebanon, and Antilebanon; coast.

28. MILIUM, L. Millet-Grass.

Spikelets 1-flowered, perfect, convex, somewhat compressed at back, the floweret sessile. Glumes equal, membranous, often a little longer than pales. Pales coriaceous, muticous, the lower obsoletely 3-nerved, concave, enclosing the 2-nerved upper one. Stamens 3. Styles 2, short, stigmas feathery — (Ours) annuals; panicle verticillate, loose.

1. M. vernale, M. B. ⊙ .3 to .4. Panicle loose, .1 to .15 long, more or less diffuse, the capillary branches whorled; glumes ovate-oblong, .002 long, acutish, tubercular-scabridulous; *pales glabrous,* the lower elliptical, obtuse — April to June —

Var **Montianum,** Coss. Stems often leafy to tip — Shady places; middle to subalpine mountain zones; interior plains.

2. M. trichopodum, Boiss. ⊙ .05 to .3. Panicle scarcely longer than leaves, ovate, *forked,* diffuse, the branches opposite or whorled in threes; *pedicels three to four times as long as spikelets;* glumes oblong-elliptical, acute, glabrous, *not tubercled;* pales *appressed-puberulent,* as long as glumes — Spring — Dry, clayey soil; Rasheya to Damascus.

29. HELEOCHLOA, Host. HELEOCHLOA.

Spikelets 1-flowered, short-pedicelled, densely spiked along a cylindrical axis. Glumes membranous, with a green, scabrous keel, somewhat shorter than sessile floweret, nearly equal. Pales similar to glumes, muticous, somewhat longer, the lower 1-nerved, keeled, the upper 2-nerved. Stamens 3. Styles 2, terminal, long; stigmas plumose — Annuals, with aspect of Crypsis.

1. H. schœnoides, L. ⊙ .1 to .25; culms forming a hemispherical tuft. Upper leaves with *much dilated*, open sheaths. Spikes ovate-oblong to oblong-cylindrical, .015 to .04 long, .006 to .009 thick, with an involucre of 1-2 of the upper leaves; glumes acute — Summer and Autumn — Wet places; common.

FIG. 385.

Spike of Heleochloa schœnoides.

2. H. alopecuroides, Schrad. ⊙ .04 to .1; culms usually simple, *geniculate-ascending. Sheaths of upper leaves cylindrical, little dilated.* Spikes oblong to cylindrical, .01 to .03 long, .003 to .004 thick, often at some distance from upper sheath; glumes and lower pale glabrous, except at ciliate-scabrous keel, rather obtuse, somewhat unequal — Late summer and autumn — Ditches; subalpine and alpine Lebanon to Akher Dagh.

Var. **acutiglumis,** Post. Glumes and lower pale tapering, acute — Subalpine and alpine Lebanon. *(H. acutiglumis, Boiss.)*

30. RHIZOCEPHALUS, Boiss. RHIZOCEPHALUS.

Spikelets 1-flowered, spiked. Glumes coriaceous, lanceolate, 3-nerved, connate at base into an urn, somewhat recurved above. Lower pale 5-nerved, coriaceous, closely convolute, enclosing the upper, hyaline, 2-nerved pale. Filaments 2. Styles 0; stigmas 2, elongated, hairy. Ovary ovate — Dwarf, nearly stemless herbs; spikes overtopped by leaves, which form an involucre.

R. Orientalis, Boiss. ⊙ .05 to .08, nearly glabrous, each plant forming a hemispherical tuft. Sheath spathe-like, many-nerved, lamina linear, acuminate, scabridulous. Spikes terminal, solitary, ovate-oblong, .01 to .015 long; spikelets short-pedicelled; glumes oblong-lanceolate, back glabrous at middle, hirtellous at margins with club-shaped papilli; lower pale somewhat longer than glumes, straight, involute, papillose-hirtellous — April — Between Qaryetein and 'Ain-el-Wu'ûl (Palmyrene Desert).

FIG. 386.



Spikelet of Rhizocephalus Orientalis magnified 4 diam.

31. PHLEUM, L. CAT'S-TAIL GRASS. TIMOTHY.

Spikelets perfect, 1-flowered, often with a rudimentary pedicel at the base of upper pale, crowded into a spiked or capitate panicle. Glumes free, nearly equal, boat-shaped, acuminate or produced into an awn. Pales membranous, not aristate, the lower truncate, the upper 2-keeled. Stamens 3. Styles 2, stigmas long, hairy — Annuals or perennials with aspect of Alopecurus.

* *Annuals. Spikes cylindrical. Culms usually several, erect or ascending.*

† *Leaves scabrous.*

1. P. tenue, Schrad. ⊙ .3 to .4. Spike .03 to .1 long, .003 to .006 thick, glaucous; spikelets compressed, *elliptical;* glumes coriaceous, glabrous, semiovate, *incurved,* acute, mucronulate, remotely 3-nerved, connivent; pales membranous, *half* as long as glumes, nearly equal, the lower 5-nerved, ovate, truncate, *denticulate,* the upper narrow, 2-nerved — Spring — Grassy places; coast.

Var. **ciliatum,** Boiss. Glumes ciliate at keel.

2. P. exaratum, Hochst. ⊙ .3 to .4. Spike .03 to .1 long; spikelets compressed, *ovate;* glumes subcoriaceous, oblong, *with deep grooves between the* 3 *nerves,* sparingly ciliate along upper part of keel, acuminate, mucronulate, *recurved at tip;* pales *about a fourth* as long as glumes, equal, puberulent, the lower 3-nerved, ovate, obtuse, *somewhat fringed,* the upper 2-nerved — Spring — Dry hillsides; Aleppo to Aintâb, and northward.

† † *Leaves smooth, or minutely scabridulous at margin.*

3. P. Græcum, Boiss. et Held. ⊙ .3 to .4. Spike .03 to .08 long; spikelets compressed, *linear;* glumes membranous, 3-nerved at back, *pectinate-ciliate along keel,* lanceolate, divergent above, *aristate-acuminate;* pales *one-sixth* as long as glumes, the lower ovate, truncate, *eroded,* 5-nerved; the upper narrower, 2-nerved — Spring — Coast.

4. P. arenarium, L. ⊙ .1 to .2. Spike .01 to .03 long; spikelets compressed; glumes lanceolate, narrowed at both ends, acuminate, straight, not divergent at tip, 3-nerved, the keel ciliate; pales *one-fourth* as long as glumes, the lower ovate, 3-nerved, obtuse, somewhat toothed, puberulent — Spring — Haifa; Beirût.

* * *Perennials. Root-stock short, fibriferous. Culms erect or geniculate below.*

5. P. Bœhmeri, Wib. ♃ .2 to .4. Spike cylindrical, .02 to .06 long, pale; glumes linear-oblong, 3-nerved, scabrous or ciliate at keel, *aristate-mucronate,* obliquely truncate below mucro; pales *two-thirds* as long as glumes, obtuse — May to September.

Var. **ciliatum,** Griseb. Glumes longer, less oblique, with longer mucro, ciliate — Ferruginous soil; alpine and subalpine Lebanon, Amanus, and northward.

6. P. pratense, L. ♃ .3 to .6. Spike *cylindrical,* .01 to .1 long, dense, *green;* glumes oblong, scarious-margined, truncate at a right angle at tip, 3-nerved at back, keel ciliate, produced into a straight mucro *one-third to one-fourth* as long as glume; pales *one-third* as long as glumes, truncate — May.

Var. **nodosum,** Boiss. Root-stock bulbous — Jebel Barûk (Lebanon).

Fig. 387.

Spikelet of Phleum pratense, magnified 6 diameters.

7. P. alpinum, L. ♃ .2 to .4. Spike *ovate to oblong and cylindrical,* .015 to .08 long, .008 to .01 thick, *purplish;* glumes oblong, hirsute, membranous-margined, truncate at a right angle at tip, 3-

nerved at back, keel long-ciliate, produced into *an awn as long as glume or a little shorter ;* pales two-thirds as long as glume—May to September.

Var. **commutatum,** Boiss. Smaller; spikes more ovate; awns shorter — Alpine Lebanon.

32. SPOROBOLUS, R. Br. Drop-Seed Grass.

Spikelets 1-flowered, perfect, somewhat laterally compressed, the floweret sessile. Glumes membranous, unequal, the upper about as long as pales. Pales membranous, muticous, nearly equal, the upper 2-keeled. Stamens 2-3. Styles 2, short; stigmas plumose — Perennials with creeping root-stocks, and aspect of Agrostis.

1. S. spicatus, Vahl. ♃ *Sammah. Abu-Rikab.* .1 to .3; stolons naked. Leaves crowded at neck and nodes of stolons, sheaths open, blades *linear*, involute, pungent, scabrous at margins, pubescent at upper, glabrous at lower surface, those of geniculate culms with long sheath and short blade. *Spike long-peduncled*, .05 to .06 long, .002 thick; glumes glossy, the lower *one-third* as long as upper, *hyaline, ovate, obtuse*, the upper lanceolate, acute; pales equal, as long as upper glume or a little longer — Spring — Maritime sands; borders of Et-Tîh, and southward to Egypt.

2. S. pungens, Schreb. ♃ .2 to .3; stolons scaly. Leaves densely 2-ranked, *sheaths enclosing one another*, bearded at mouth, the blades pubescent at upper, glabrous at lower surface, *lanceolate to lanceolate-linear*, subulate-tapering, convolute at tip, pungent. *Panicle sheathed by uppermost leaf*, .03 to .05 long, .01 to .015 broad, oblong-ovate, compact; glumes glabrous, glossy, *lanceolate*, the lower *two-thirds* as long as upper; pales similar to glumes, equal, as long as upper glume — June to October — Maritime sands; common.

33. AGROSTIS, L. Bent-Grass.

Spikelets 1-flowered, the floweret perfect, sometimes with a rudimentary floweret above. Glumes keeled or compressed. Pales with a round, smooth wart at base, membranous, the lower 5-nerved, muticous or aristate at back, the upper smaller, 2-keeled, sometimes 0. Stamens usually 3. Styles 2, stigmas plumose — Perennials or annuals; spikelets panicled.

* *Lower pale muticous. Rudiment of second flower* 0.

1. A. verticillata, Vill. ♃ Whorled Bent-Grass. *Na'im. Sunbuleh.* .2 to .5, decumbent, often rooting at lower nodes. Leaves *linear-lanceolate*, .03 to .08 long. Panicle oblong, dense, .04 to .15 long, .006 to .025 broad, somewhat whorled, scabrous, spikelets crowded; glumes equal, oblong, obtuse, appressed-puberulent; pales half as long as glumes, nearly equal — April to August — Wet places; common.

2. A. alba, L. ♃ Fiorin Grass. White Bent Grass. .5 to .8, decumbent, rooting at lower nodes. Leaves *narrowly linear*, .1 to .3 long. Panicle oblong-lanceolate, .1 to .2 long, .005 to .015 broad, loose, somewhat spreading in flower, contracted in fruit; glumes lanceolate, acute, about equal, keel scabrous; lower pale shorter than glumes, denticulate at tip, muticous, twice as long as upper — Summer — Wet, sandy fields, and rocky places; middle to subalpine Lebanon.

Var. **scabriglumis,** Boiss. The glumes scabrous over their whole outer surface — Lebanon.

* * *Lower pale awned. Rudimentary floweret a stalk and single pale.*

3. A. interrupta, L. ⊙ Wind-Grass. .25 to .5, erect, slender. Leaves linear, .05 to .15 long. Panicle oblong-lanceolate, .1 to .15 long, contracted, branches whorled, bearing spikelets almost to base; glumes unequal, lanceolate, acute; lower pale about as long as glume, acute, *asperulous,* with a slender, flexuous awn below its tip, four times its length — May and June — Fields; Jedaideh (Antilebanon).

34. POLYPOGON, Desf. Beard-Grass.

Spikelets 1-flowered, laterally compressed, the floweret perfect, sessile. Glumes much longer than floweret, membranous, keeled, awned a little below the undivided or bilobed tip. Lower pale awned below the truncate-denticulate tip, or muticous, the upper smaller, 2-keeled. Styles 2, terminal, very short; stigmas plumose with dentate hairs — (Ours) annuals, with minute spikelets, in a very contracted panicle or spike.

P. Monspeliense, L. ⊙ *Dheil-eth-tha'leb. Sar-el-Fâr. Dheil-el-Fâr. Dheneb-el-Fâr.* .3 to .8. Panicle dense, .06 to .15 long, .02 to .035 thick, more or less interrupted; glumes equal, *scabrous-pubescent,* ciliate-margined, oblong, apex obtuse, *entire;* awn thrice as long as glume; lower pale *half* as long as glume, 4-toothed and *short-awned* — April to July — Moist, sandy places; common.

Fig. 388.



a. Spikelet of Polypogon Monspeliense. *b.* Open floweret. 5 diameters.

2. P. maritimum, Willd. ⊙ .05 to .2. Panicle spike-like, oblong, .01 to .04 long, .008 to .01 thick; glumes equal, *the back beset with silvery scales below,* ciliate-margined, oblong-cuneate, *bifid, the awn arising from the sinus,* four times as long as glume; lower pale *one-third* as long as glume, apex 4-toothed, *muticous* — Spring — Sands; coast; damp woods at base of Cassius; Jordan Valley.

35. GASTRIDIUM, P. de B. Gastridium. Nit-Grass.

Spikelets 1-flowered, perfect, laterally compressed, the floweret sessile. Glumes membranous, keeled, acute, usually inflated at base, much longer than floweret. Pales membranous, minute, the lower broader, truncate-denticulate or with 2 bristles, furnished with a geniculate or muticous awn, inserted below apex or at base. Styles 2, short; stigmas plumose — Annuals, with aspect of Phleum or Kœleria. Leaves linear, flat.

1. G. lendigerum, L. ⊙ .3 to .4. Panicle spike-like, tapering at both ends, .05 to .1 long, .006 to .008 broad, looser in flower, contracted in fruit; glumes lanceolate, acuminate, *scabrous at keel, otherwise glabrous, glossy,* the upper shorter; *lower pale hirsute,* truncate-dentate at tip, *usually with an awn under tip longer than glume,* rarely muticous — Spring — Grassy places; coast; Antilebanon; Banias.

2. G. scabrum, Presl. ⊙ *Subbeileh.* .2. Spike .04 to .05 long, .003 to .004 thick; glumes *scabrous over outer surface,* lanceolate, acute, the upper somewhat shorter; *lower pale nearly glabrous,* truncate-dentate at tip, *usually not awned* — June and July — Fields; coast to middle zone of Lebanon.

36. AMMOPHILA, Host. AMMOPHILA.

Spikelets 1-flowered, laterally flattened, with one, perfect, short-stalked floweret, and the rudiment of a second. Glumes membranous, coriaceous, nearly equal, the lower 1-nerved, the upper 3-nerved. Pales coriaceous, nearly equal, the lower bearded at base, compressed-keeled, 5-nerved, 2-toothed, with a short mucro at sinus, upper 2-keeled. Styles short, stigmas feathery — Perennials, with stout stems, and long, spike-like panicles.

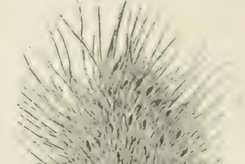
A. arenaria, L. ♃ 1 or more, growing in clumps from a creeping, woody root-stock. Leaves long, involute, sharp-pointed. Panicle .25 to .3 long, .015 to .02 thick; glumes and pales about .01 long; mucro of lower pale as long as teeth — April — Sands; Haifa.

37. LAGURUS, L. HARE'S-TAIL GRASS.

Spikelets laterally flattened, with one fertile floweret, and the rudiment of a second. Glumes subulate-tapering, feathery, longer than floweret. Lower pale bifid-aristate, with a dorsal, bent awn, inserted below sinus; upper pale narrower, 2-keeled — Annuals, with dense, ovate, woolly heads.

L. ovatus, L. ⊙ .1 to .4, erect or ascending. Leaves villous. Heads .015 to .04 long, .015 to .02 thick; central awn nearly twice as long as lateral ones, and all the awns long-exserted — Spring — Sandy and dry places especially near coast.

FIG. 389.



Head of Lagurus ovatus.

38. AIRA, L. HAIR GRASS.

Spikelets with 2, perfect flowerets, and often with the rudiment of a third. Glumes nearly equal, usually longer than pales. Lower pale rounded at back, usually bifid or with two bristles at tip, and a twisted or bent but not club-shaped awn inserted on the back, or muticous. Upper pale 2-keeled, 2-toothed. Stigmas 2, sessile, plumose — Annuals, with spikelets panicled on capillary pedicels.

A. capillaris, Host. ⊙ .2 to .5; culms slender. Leaves setaceous. Panicle trichotomous, diffuse, .05 to .08 long; pedicels several times as long as spikelets, scabrous; glumes oblong, scabrous, eroded at tip, mucronate; lower floweret usually muticous; lower pale of upper floweret with a bent awn at middle of back, twice as long as glumes — April to June — Dry, sandy places.

FIG. 390.



Tip of panicle of Aira capillaris.

39. CORYNEPHORUS, P. de B. CLUB GRASS.

Spikelets with 2 fertile flowerets, the lower sessile, the upper stipitate. Glumes scarious, boat-shaped, keeled, nearly equal, longer than flowerets. Pales scarious, nearly equal; the lower aristate from its base, the awn jointed at its middle, the lower joint twisted, blackish,

ending opposite the tip of the pale, in a bearded disc, from which arises the slender upper joint, ending in a club-shaped tip. Stigmas 2, sessile, feathered — Annuals.

C. articulatus, Desf. ⊙ .3; culms slender. Leaves convolute-setaceous. Panicle erect, .1 long, spreading during flowering, contracted before and after; branches capillary, several times trichotomous. Spikelets short-pedicelled; glumes greenish and reddish — Spring — Sandy places; Antilebanon; Tiberias.

40. HOLCUS, L. Soft Grass.

Spikelets 2-flowered, laterally compressed. Glumes longer than flowerets, boat-shaped, nearly equal, the upper broader, 3-nerved, the lower 1-nerved. Flowerets stipitate, the lower perfect, muticous, the upper staminate, its lower pale aristate below tip. Upper pales about as long as lower, narrower, 2-keeled. Stigmas short, plumose with dentate hairs — Herbs; panicles loose or spike-like.

1. H. lanatus, L. ♃ .5 to .8. Leaves linear-lanceolate to linear, flat, villous. Panical *oblong-ovate*, .06 to .12 long, .04 to .06 broad, at length contracted, white; glumes ovate-lanceolate, puberulent or scabrous, ciliate at keel, *the upper retuse, mucronulate;* lower pale of upper floweret with a hooked, dorsal awn, barely exserted from glume — April to June — Fields; Lower zone of Lebanon.

Fig. 391. Fig. 392.

Fig. 391. Spikelet of Holcus lanatus. 5 diameters.

Fig. 392. Spike of Holcus annuus.

2. H. annuus, Salzm. ⊙ .2 to .4. Leaves linear, flat, soft-pubescent. Panicle *cylindrical-oblong*, .03 to .05 long, .008 to .01 broad; glumes pubescent, the lower lanceolate, *with an awn shorter than itself*, the upper ovate, *with an awn as long as itself;* lower pale of upper floweret with a bent and twisted, dorsal awn, exserted from glume — April to June — Fields; coast to middle mountain zone.

41. TRISETUM, Pers. Trisetum.

Spikelets laterally compressed, 2-6-flowered, flowerets perfect or the uppermost tabescent, all but the lowest stipitate. Glumes keeled, membranous, 1-3-nerved. Lower pale concave, bicuspid at tip, with a bent or straight awn usually twisted below, inserted at back below tip. Stamens 3. Stigmas 2, sessile, plumose. Caryopsis destitute of groove, glabrous — Herbs; spikelets small, panicled.

* *Annuals. Stems except* (4) *slender, low.*

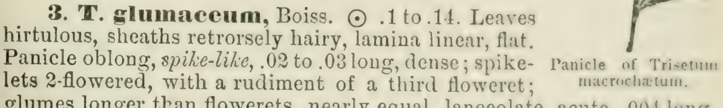
1. T. pumilum, Desf. ⊙ .03 to .15. Leaves linear, *flat*, pubescent. Panicle ovate-oblong to oblong, .01 to .025 long, compact; spikelets .005 long, about 4-flowered; glumes somewhat shorter than flowerets, ovate-oblong, about equal in length, but the lower a little broader and villous, the upper villous throughout or only at back; hairs of axis and wart as long as pales; lower pale punctate-scabrous, awn straight, as long as pale — March to May — Desert sands; Arabia Petræa.

2. T. macrochætum, Boiss. ⊙ .1. Leaves glabrescent, *linear-setaceous, the lower convolute.* Panicle .025 to .03 long, rather loose, contracted; spikelets 2-flowered, with a hairy, sterile rudiment; glumes scabrous at keel, acuminate, longer than flowerets, the lower linear, one-third as broad and two-thirds as long as upper; upper glume .004 long; lower pale half as long as glumes, *the tip ending in 2 bristles, half as long as pale,* the awn bent, twisted below, *thrice as long as glumes* — Spring — Jerusalem; 'Ain Jidi to Beni-Na'îm.

FIG. 393.



Panicle of Trisetum macrochætum.



3. T. glumaceum, Boiss. ⊙ .1 to .14. Leaves hirtulous, sheaths retrorsely hairy, lamina linear, flat. Panicle oblong, *spike-like,* .02 to .03 long, dense; spikelets 2-flowered, with a rudiment of a third floweret; glumes longer than flowerets, nearly equal, lanceolate, acute, .004 long, glabrous, glossy, somewhat scabrous at keel, axis at base of upper floweret and sterile stalk long-hairy; lower pale half as long as glumes, ending in two bristles *half as long as itself,* and a bent awn *short-exserted from glumes* — Spring — Et-Tîh, between Nukhl and Gaza, and southward to Egypt

4. T. lineare, Forsk. ⊙ .25 to .45; culms thickish, rigid, appressed-hirtellous. Sheaths long, nerved; lamina linear, at length convolute. Panicle cylindrical, spike-like, .05 to .15 long; spikelets short-pedicelled, 2-flowered with the upper floweret stipitate, or 1-flowered, with the upper floweret reduced to an awn; glumes nearly equal, longer than pales, linear-lanceolate, .004 to .005 long, acuminate, 3-nerved below; lower pale tapering into two bristles *as long as itself,* sometimes with a third shorter one, the bent awn twisted at base, *twice to three times as long as bristles;* upper pale narrower, bifid — May to July — Syrian coast, and southward to Arabia Petræa and Egypt.

* * *Perennials. Stems tall, slender.*

5. T. flavescens, L. ♃ .5 to .8, tufted. Leaves linear, flat, rough-margined, more or less pubescent below and at sheaths. Panicle compound, *loose,* .1 to .15 long, .03 to .15 broad, *oblong,* contracted in fruit, branches slender, rough; spikelets *yellow,* 2-3-flowered; lower glume 1-nerved, *much shorter and narrower than upper,* upper 3 nerved, oblong-lanceolate, acuminate; hairs of axis much shorter than flowerets; lower pale ending in two *short* bristles, the bent awn *longer than pale* — June — Ruweissât (Lebanon).

42. VENTENATA, Kœl. VENTENATA.

Spikelets laterally compressed, 3-6-flowered (rarely 1-flowered with a sterile rudiment), the flowerets perfect, all but the lowermost stipitate, the uppermost often reduced to a rudiment. Glumes membranous, keeled, the lower shorter. Lower pales oblong-lanceolate, 2-toothed or -bristled, with a bent, dorsal awn, twisted below; upper pale 2 keeled. Stamens 3. Stigmas 2, sessile — Annuals.

* *Spikelets loosely panicled,* 1-2-*flowered, with a muticous rudiment.*

1. V. Blanchei, Boiss. ⊙ .2 to .5. Panicle oblong, .06 to .15 long, .03 to .05 broad, branches somewhat whorled, capillary, scabrous; *pedicels club-shaped*, short; spikelets 2-3 at end of branches, glumes lanceolate, long-acuminate, scabrous at prominent nerves, the lower one-third as long as upper; lower pale of fertile floweret lanceolate, acuminate, 2-keeled, with short bristles at tip, awn twice as long as pale — May and June — Middle to subalpine Lebanon; Ḥaurân.

* * *Spikelets short-pedicelled, spiked,* 3-6-*flowered.*

2. V. macra, Stev. ⊙ .3 to .7. Spikes .05 to .08 long, .006 thick, excluding awns; spikelets .01 to .015 long, .002 thick, fusiform; glumes oblong-lanceolate, acute, nearly equal, glabrous; pales of upper flowerets 2-dentate, awn twisted, once and a half to twice as long as pale — April — Antilebanon; Dîmâs.

FIG. 394.

Spike of Ventenata macra.

43. AVENA, L. OAT. *Sheifûn.*

Spikelets flattened or terete, 2-∞-flowered, panicled, the flowerets usually firmer in texture than the glumes, perfect, the uppermost often sterile. Glumes concave, herbaceous; lower pale of perfect flowerets concave, more or less chartaceous, often rolled up in fruit, bifid at apex, with a long, straight, or bent and twisted, dorsal awn, upper pale 2-keeled, flat, 2-toothed. Stamens 3. Caryopsis spindle-shaped, hairy toward tip, grooved on one side, free from but invested by the upper pale. Pales of sterile flowerets muticous — Herbs, with large spikelets, usually on long peduncles, panicled.

* *Spikelets at length pendulous. Panicle loose. Annuals.*

† *Flowerets not jointed with axis, falling with it in one piece.*

1. A. Orientalis, Schreb. ⊙ .5 to .8. Panicle contracted, one-sided; spikelets 2-flowered; glumes acuminate, longer than flowerets; axis glabrous, or hairy at the base of lower floweret; lower floweret sessile, both aristate or the upper muticous; lower pale bidenticulate at tip, awn straight or flexuous, *not twisted below* — May and June — Reifûn; Feitrûn (Lebanon).

† † *Lower floweret only jointed with axis, the upper falling with segment of axis in one piece.*

2. A. sterilis, L. ⊙ *Khafûr. Sheifûn.* .4 to .8, glabrous. Spikelets *large*, 3-4-flowered, two or rarely three of the flowerets aristate and bristly from base to middle, the upper one or two glabrous and muticous; lower pale of lower floweret with a *broad* callosity and *ovate* scar at base, *bifid* at tip *but teeth not awned*, dorsal awn twice to twice and a half as long as glumes — April to June — Fields, vineyards, and olive groves; common.

† † † *All the flowerets jointed with axis, falling separately.*

3. A. clauda, Dur. ⊙ .5 to .8, sparingly hairy. Spikelets 3-4-flowered, *the lower glume half as long as upper;* lower pale of lower floweret *glabrous at back*, with a *linear* callosity and *linear* scar at base,

bifid-aristate at tip, awn twice as long as upper glume — Spring — Nazareth; Aintâb.

4. A. barbata, Brot. ⊙ *Khafûr. Sheifûn.* .5 to .8, *sparingly pubescent or velvety.* Spikelets 2-3-flowered; glumes nearly equal, 9-nerved. Lower pale hairy from base to middle, with an *oblong callosity and scar* at base, bifid, *teeth long-aristate;* awn more than twice as long as glumes—April to June—Fields and waste places; common throughout.

5. A. Wiestii, Steud. ⊙ *Khafûr. Zummeir.* .5 to .8, sparingly hairy. Panicle one-sided, spikelets 2-flowered, *small;* glumes equal, *7-nerved;* lower pale .012 long, *hairy almost to tip,* with an *ovate-oblong callosity and scar at base,* bifid, teeth setaceous-aristate; awn twice as long as glumes — Spring — Borders of et-Tîh toward Palestine; Tel-el-Ḥammâm (Jordan Valley).

6. A. fatua, L. ⊙ *Shakshûk. Zummeir. Sabûs.* .5 to .8, glabrous or sparingly hairy at sheaths. Panicle spreading; spikelets 2-3-flowered, all the flowerets awned; glumes nearly equal; lower pale bristly from base to middle, with *an oblong or ovate callosity and scar* at base, bifid-dentate; awn more than twice as long as glumes — March to June — Arabia Petræa; Cedars of Lebanon.

† † *Spikelets erect. Panicle spike-like, simple. Perennials.*

7. A. Carmeli, Boiss. ♃ .4 to .5; root fibrous; culm erect. Leaves narrowly linear, flexuous, flat, margin scarcely thickened, glabrous; sheaths retrorsely hispid. Panicle spike-like, .05 long, simple, erect; spikelets 2-3-flowered, twin, pedicels unequal, one very short, the other one-third as long as spikelet; glumes lanceolate-linear, short acuminate, the lower 3-nerved, the upper 5-nerved; axis glabrous, brittle; lower pale coriaceous, convolute, punctate-scabrous, membranous at tip, short 2-dentate, the awn once and a half as long as pale — May — Mt. Carmel.

44. GAUDINIA, P. de B. Gaudinia.

Spikelets laterally compressed, 4-7-flowered, parallel to axis, sessile in its grooves. Flowerets somewhat distant from each other, perfect or the uppermost tabescent. Glumes membranous; concave, keeled, the lower 3-nerved, much smaller, the upper 7-9-nerved. Pales membranous, the lower lanceolate, scarious-margined, bidentate at tip, with twisted and bent awn inserted above the middle of the back, the upper 2-keeled, bifid. Caryopsis ciliate at tip — Annuals, with spikelets 2-ranked in a linear spike.

Fig. 395.



Spikelet of Gaudinia fragilis with a node of stem above its base.

G. fragilis, L. ⊙ .2 to .35; culms tufted, erect or ascending. Leaves soft-villous, linear, flat. Spike .1 to .25 long; spikelets glabrous or pubescent; lower glume one-third as long as upper; upper glume shorter than floweret; awn longer — May to July — Fields and waste places; coast to middle mountain zones, and interior plains.

45. ARRHENATHERUM, P. de B. Oat Grass.

Spikelets laterally compressed, 2-flowered, generally with a rudiment of a third floweret, the lower floweret staminate, the upper perfect.

Glumes membranous, concave, the lower shorter, the upper broader, as long as floweret. Lower pale concave, bidentate or 2-4-cleft, in the lower floweret with a long awn, twisted below, inserted near or at the base, in the perfect floweret with a straight awn near the tip or muticous. Upper pale 2-keeled, 2-cleft — Perennials; the neck twisted, with one or two rounded tubers; spikelets on capillary pedicels in loose panicles.

1. A. elatius, L. ♃ .5 to .8. Glumes lanceolate, *somewhat obtuse*, scabrous at keel, .007 long; *both lower pales short-bidentate ;* awn of staminate floweret *inserted below middle*, twice to twice and a half as long as pale; lower pale of perfect floweret sparingly hirsute, with awn inserted near middle, barely exserted from glume or included — April to June —

FIG. 396.

(*a*) Glumes of A. elatius. (*b*) The two flowerets, with awned lower pales.

Var. **Palæstinum**, Boiss. Spikelets smaller. Lower pale of upper floweret appressed-hirsute for two-thirds of its length — Lower and middle mountain zones of coast ranges.

2. A. Kotschyi, Boiss. ♃ .5 to .8. Glumes lanceolate, *acute, aristate with excurrent nerve*, scabrous at keel, .009 to .012 long; *both lower pales bifid, the teeth also bifid ;* awn of staminate floweret *inserted at base*, twice to twice and a half as long as pale; lower pale of perfect floweret densely hirsute, with awn inserted one-third its length below tip, barely exserted from glume — April to June — Plateaux of Moab, Gilead, Haurân, Damascus, and northward to Aintâb; Antilebanon above Zebedâni (1500 m).

46. DANTHONIA, D. C. WILD OAT GRASS.

Spikelets 2-ranked, 2-5-flowered, laterally compressed, the flowerets perfect except the uppermost which is sterile. Axis jointed. Glumes nearly equal, concave, as long as flowerets or longer. Lower pale concave, many-nerved, bifid at tip, with a long awn, flattened and twisted below, inserted between the teeth; upper pale 2-keeled — Perennials; spikelets in a compact, spike-like panicle.

D. Forskahlei, Vahl. ♃ *Halfâ. Shajaret-el-Jemel.* .4, *velvety*; root-stock tufted, indurated, with long fibres; culms procumbent at base, often branched, then ascending. Leaves broad-linear, acuminate, .01 to .06 long, rigid, crowded near base; upper sheath dilated, forming a spathe to the panicle. Panicle .07 to .1 long, .01 to .015 broad; spikelets 3-flowered; glumes many-nerved, oblong-lanceolate, acuminate, longer than flowerets; lower pale coriaceous, long-bearded, tapering to a sharp spur-like base; awn as long as glume and twice as long as teeth — Spring — El-'Arabah, and southward, and westward.

47. CYNODON, Rich. BERMUDA GRASS. SCUTCH GRASS. DOG'S TOOTH GRASS. *'Irq-en-Najîl.*

Spikelets 1-flowered, with a rudimentary floweret at base, imbricate-spiked along the outer side of a long, flattened rachis. Glumes nearly equal, keeled, somewhat spreading, muticous. Pales membranous, the lower boat-shaped, the upper 2-keeled — Perennials, with digitate spikes.

C. Dactylon, L. ♃ *Tayyin. Shilsh-el-Enjîl.* Root-stock creeping, bearing many sterile branches with 2-ranked, short, linear,

acuminate, crowded leaves; culms branching at base, with scattered longer leaves. Spikes 4-7, .02 to .05 long, green or purplish — All the year — Waste places, especially in sandy soil; everywhere. A most troublesome weed.

48. TETRAPOGON, Desf. Tetrapogon.

Spikelets on the outer face of a flattened rachis, 2-ranked, 3-4 flowered, the lower two flowerets perfect, the others tabescent, consisting of one pale. Glumes 2, persistent, membranous, keeled, the lower acuminate, the upper rounded at tip, aristate-mucronate. Lower pale keeled, 3-nerved, obtuse or retuse, long-awned just below tip; upper pale retuse, 2-keeled — Perennials; spikelets in 2, erect spikes, adnate by their inner face, appearing to form one, 4-ranked spike.

Fig. 397.



Spike of Tetrapogon villosum.

T. villosum, Desf. ♃ .2 to .3, tufted; rootstock thickish, with a dense rosette of leaves; culms erect, sparingly leafy. Leaves glabrous, linear, channeled, the radical somewhat 2-ranked, crowded. Spikes .04 to .06 long, .015 thick (including crowded awns); lower pale obovate, obtuse, concave, silky-hairy at back, obtuse or retuse at tip, with an awn twice to four times as long — Spring — Valleys about Dead Sea, and southward to Sinai and Egypt.

49. DACTYLOCTENIUM, Willd. Egyptian Grass.

Spikelets arranged along the outer aspect of the flattened rachis, alternate, sessile, laterally compressed, 2-∞-flowered, the flowerets, except the uppermost which is tabescent, perfect. Glumes nearly equal, keeled, membranous, shorter than flowerets, the upper mucronate-aristate at or a little below tip; upper pale 2-keeled. Annuals; spikes digitate.

D. Ægyptiacum, L. Egyptian Grass. ⊙ *Rijl-el-Harbâyeh. Na'îm-eṣ-Ṣalîb.* .4 to .6; culms prostrate below, geniculate, rooting at joints, branching. Spikes 3-5, .05 long, .005 broad, mucronate by excurrence of rachis; lower glume oblong, acute to acuminate, upper ovate, larger, rounded at tip, retuse, with an awn as long as itself in the notch; lower pale mucronate-aristate, the lateral nerves obsolete — Spring — Sidon (Gaill. in Fl. Or.).

50. PAPPOPHORUM, Schreb. Pappophorum.

Spikelets laterally compressed, 2-3-flowered, the lowest floweret perfect, the upper staminate or neuter. Glumes lanceolate, many-nerved, muticous, longer than flowerets. Lower pale somewhat leathery, concave, 9-nerved, the nerves excurrent in straight, subulate awns. Upper pale membranous, 2-keeled, retuse — Tufted annuals or perennials, with spike-like panicle.

Fig. 398.

(a) Spikelet of P. Foxii. (b) Lower pale 6 diameters.

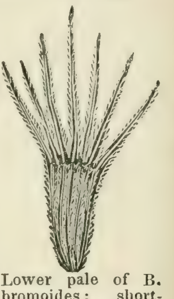
P. Foxii, Post. ⊙? .06 to .1, pubescent; culms geniculate-ascending. Leaves narrow-linear, convolute, mouth of sheath short-bearded. Panicle cylindrical, .02 to .03 long, .006 broad;

spikelets mostly 2-flowered; glumes shorter than awns, the lower two-thirds as long as upper; lower pale villous-hirsute, obovate, awns straight, twice to twice and a half as long as pale, feathery below, scabrous above, the alternate 4 a little shorter — April — Ghôr-eṣ-Ṣafîeh.

51. BOISSIERA, Hochst. BOISSIERA.

Spikelets terete, 5-6-flowered, the flowerets closely imbricated along the axis, the lower 2-3 perfect, the rest reduced to a pale. Glumes 2, membranous, many-nerved, somewhat unequal, much shorter than flowerets. Lower pale coriaceous, linear, concave, many-nerved, ending in a hyaline, frayed-dentate tip; awns 7-9, scabrous, somewhat twisted, dilated at base, inserted at the base of the hyaline tip. Upper pale as long as lower, but narrower, 2-keeled, 2-toothed — Dwarf annuals, with aspect of Bromus rubens.

FIG. 399.



Lower pale of B. bromoides; short-awned form.

B. bromoides, Hochst. ⊙ .06 to .15, appressed-puberulent; culms solitary or tufted, ascending or erect, often geniculate below, leafy to base of inflorescence. Panicle fasciculate-capitate, obovate, .03 to .04 long; glumes lanceolate, one-third the length of the lowest floweret, acute, the upper somewhat longer, sometimes mucronulate; lower pale 11-13-nerved, more or less hirsute below awns, terminal membrane one-fifth as long as pale, the longest awns twice to thrice as long as pale — May to July — Subalpine Lebanon; Cœlesyria; Antilebanon and Hermon; Damascus Plateau; Syrian Desert; Sinai.

52. TRIODIA, R. Br. TRIODIA.

Spikelets 2-ranked, 3-5-flowered, somewhat laterally compressed, lower flowerets perfect, upper sterile. Rachis jointed, the callosities bearded or glabrous. Glumes nearly equal, somewhat longer than flowerets. Lower pale concave, at length cartilaginous, ciliate at margin or glabrous; apex bidentate with a mucro or awn in sinus; upper pale 2-keeled, with ciliate or glabrous margin — Herbs with spikelets in a short, interrupted spike.

FIG. 400.



Spike of T. glaberrima.

T. glaberrima, Post. ♃ .3, *glabrous,* tufted; roots fibrous; culms erect, slender, leafy to two-thirds their height. Leaves narrow-linear, convolute, acuminate, ligule reduced to a thin, tawny, frayed edge. Spike simple, of 1-3-spikelets, the internode longer than the spikelet; spikelet .01 long, pedicels obsolete; flowerets 2-ranked; glumes linear-lanceolate, acute, 5-nerved; *axis and pales glabrous;* lobes of lower pale hyaline, triangular-ovate, obtuse; awn slender, hyaline, *plumose,* a little longer than lobes — May — Between Bûrmah and Gerash (Gilead).

Species with aspect of **T. decumbens,** L., differs by being glabrous throughout, even to the axis of the inflorescence and the pales, and by the hyaline lobes and plumose awn.

53. DIPLACHNE, P. de B. DIPLACHNE.

Spikelets many-flowered, linear, short-pedicelled, somewhat remote

along the branches of the panicle; flowerets perfect; axis jointed. Glumes unequal. Lower pale keeled, acute, bidenticulate at tip, and the keel produced into a straight mucro; upper pale 2-keeled, bifid at tip — Tall herbs with aspect of the Halfâ (Eragrostis cynosuroides), but with a branching panicle.

D. fusca, L. ♃ *Abu-er-Rukbeh. Abu-en-Na'jeh. Seifûn. Khirs.* .6 to 1; root-stock creeping; culms prostrate at base, geniculate-ascending, then erect, leafy to near base of panicle. Leaves linear, acuminate, scabrous. Panicle oblong, .15 to .2 long, .05 to .06 broad, branches somewhat remote, ascending, bearing spikelets from base; pedicels almost 0; spikelets brownish-green, oblong-linear, 5-9-flowered; glumes lanceolate-linear, scabrous at keel, the lower half as long as upper; lower pale linear-lanceolate, bidentate a little below tip, mucronulate in sinus — Wet meadows; Syrian coast to Egypt.

54. ARUNDO, L. Reed. *Qaṣab.*

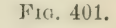
Spikelets 2-7-flowered, laterally compressed, the flowerets perfect, the uppermost tabescent or reduced to a stalk. Glumes 2, membranous, concave, nearly equal. Axis glabrous. Pales membranous, the lower silky-hairy, (ours) bifid at tip with a short awn at sinus; upper pale much shorter and narrower, 2-keeled, truncate and sometimes 2-toothed at tip — Tall grasses, growing in swamps, and by streams.

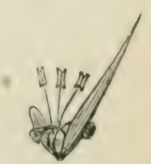
A. Donax, L. ♃ Persian Reed. *Bûs Fârisi. Bûs Hejni. Qaṣab Fârisi.* 5 to 6; root-stock creeping, tuber-bearing; culms .02 or more thick at base, woody. Leaves lanceolate-linear, .5 to 1 long, .02 to .08 broad at base, *smooth at margins.* Panicle thyrsoid, .4 long, .05 to .08 broad, *white,* spreading in flower; spikelets 3-4-flowered; glumes oblong-lanceolate, with scabrous keel; lower pale somewhat longer than glumes, the hairs as long as glumes — July to December — Common throughout. Probably the "reed shaken by the wind." (Mt. xi, 7.)

55. PHRAGMITES, Trin. Reed.

Spikelets 3-7-flowered, laterally compressed, the lower floweret of the spikelet staminate, the others perfect. Axis bearded with long hairs. Glumes unequal, keeled, acute, shorter than flowerets. Pales membranous, glabrous, the lower lanceolate, long-acuminate, the upper one-third as long, 2-keeled — Tall grasses growing in stagnant waters and marshes.

Ph. communis, Trin. ♃ *Ghâb. Hejn. Bûs. Teneimi. Ṭâghâmîneh.* 1 to 4; root-stock long, creeping; culms .01 or more thick at base, woody, leafy. Leaves firm, 2-ranked, lanceolate, .01 to .03 broad at base, *rough at margins.* Panicle .2 to .3 long, .05 to .08 broad, *brown or yellowish;* glumes lanceolate, the lower *half as long as the upper* — September to December.


Fig. 401.


Perfect floweret of Phragmites communis. 2 diameters.

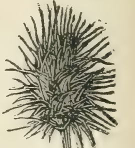
Var. **Isiacus,** Coss. Taller. Leaves often very broad. Panicle broader — Common in marshes, even in oases of deserts.

Var. **stenophyllus,** Boiss. Leaves shorter, narrower, linear, often convolute and pungent — Sands, especially along coast, and in salt marshes; common.

56. ECHINARIA, Desf. Echinaria.

Spikelets 2-3-5-flowered, wedge-shaped, laterally compressed, sessile, crowded into a head, the flowerets perfect, the uppermost sometimes tabescent. Glumes 2, unequal, membranous, keeled, the lower 2-3-awned, the upper 1-nerved, 1-awned. Lower pale coriaceous, concave, 5-7-nerved, the nerves ending in unequal, divergent spines; upper pale 2-keeled, the keels produced into spines at tip — Annuals, the heads with a few spiny scales (empty glumes and pales) at base.

Fig. 402.



Head of E. capitata.

E. capitata, L. ⊙ .05 to .3; culms solitary or numerous, leafy below. Leaves flat, linear, puberulent. Head globular to ovate, .01 to .015 long, the longest spines of lower pale 3-4-times as long as pale — April to June — Dry places; common.

57. AMMOCHLOA, Boiss. Ammochloa.

Spikelets laterally compressed, 7-15-flowered, flowerets perfect. Glumes shorter than lower flowerets, ovate-oblong, acute, somewhat unequal, scarious-margined, keel to one side, with a broad, scarious wing. Lower pale coriaceous, scarious-margined, ovate-oblong, tapering into a somewhat prickly point; upper pale shorter and narrower, hyaline, linear-lanceolate, ciliate at the two keels — Annuals, with spikelets in a 2-ranked, flattened, globular to oblong spike, with a sort of involucre of abortive spikelets.

Fig. 403.



Spikes of A. subacaulis.

A. subacaulis, Bal. ♃ .03 to .07, tufted. Heads nearly sessile, clustered among radical leaves, or on culms shorter than the leaves. Leaves membranous, dilated at base, linear, elongated, flexuous — March and April — Coast; Beirût to Jaffa, and southward to Egypt; Damascus; Tiberias.

58. SESLERIA, Arduin. Sesleria. Moor-Grass.

Spikelets laterally compressed, 2-6-flowered, flowerets perfect, the uppermost sometimes sterile. Glumes keeled, shorter than flowerets. Lower pale membranous, keeled, 4-5-toothed at tip; upper 2-keeled, bifid — Perennials; spikelets nearly sessile in a cylindrical spike.

S. argentea, Savi. ♃ .2 to .5, tufted, stoloniferous. Leaves rigid, glaucous, linear, scabrous-margined. Spike .03 to .04 long, .005 to .006 broad; glumes lanceolate, acuminate-aristate, scabrous at keel, nearly as long as flowerets; lower pale scabrous at keel, with 2-4 teeth or bristles and a short awn, or tapering into a short awn — May to July — Alpine Lebanon.

59. LAMARCKIA, Mænch. Lamarckia.

Spikelets laterally compressed, clustered; some fertile, short, 2-flowered, the lower floweret perfect, short-stalked, the upper tabescent and long-stalked within the glumes; the others sterile, elongated, 6-9-flowered, reduced to glumes, and imbricated, 2-ranked, obtuse, muticous, lower pales. Glumes hyaline, lanceolate, tapering at both ends, as long as flowerets. Lower pale of fertile floweret lanceolate, 5-nerved, hirtulous, bifid, aristate between teeth; upper pale 2-keeled, bifid — Annuals; panicles one-sided, racemose.

L. aurea, L. ⊙ .1 to .35; culms tufted, leafy. Leaves soft,

linear, flat, acuminate. Panicle oblong, at length *golden or flaxen-colored*, .03 to .07 long, .01 to .02 broad, branches nodding, hispid, bearing 3-4 spikelets on clustered, capillary pendulous pedicels, one fertile with two awns, the others sterile, muticous, shorter than awns; sterile spikelets 01. long, four times as long as their glumes; sterile lower pales obovate, eroded-denticulate, scarious — Spring — Sandy fields and roadsides; common.

60. CYNOSURUS, L. Dog's Tail Grass.

Spikelets laterally flattened, short-pedicelled, some fertile, 2-5-flowered, others sterile, many-flowered, the flowerets reduced to linear-lanceolate, lower pales; all the spikelets arranged in a one-sided, spike-like or capitate panicle. Glumes scarious, keeled, nearly equal. Lower pales 3-5-nerved, not keeled, 2-toothed at apex, mucronate, or awned; upper pales 2-keeled, bifid. (Ours) Annuals.

C. echinatus, L. ⊙ .2 to .4. Panicle densely capitate, ovate-oblong, with short branches; fertile spikelets 2-*flowered;* glumes *lanceolate, subulate at tip*, once and a half as long as floweret; awns of fertile lower pale *two or three times* its length; lower pales of sterile spikelets 2-ranked; awns of lower ones a *little longer than pale, all lilac-purple or flavescent* — Fields and roadsides; common.

2. C. callitrichus, W. Barbey. ⊙ .15 to .3. Panicle ovate, densely capitate, with short branches; fertile spikelets 1-*flowered;* glumes lanceolate, *long-subulate*, nearly twice as long as floweret; awn of fertile lower pale 8-10-*times its length;* sterile pales *not 2-ranked, but somewhat spirally arranged;* lower awns 5-8 *times as long as* pales, *all violet-purple*—Spring—Dry places; Doherîyeh; Temple area at Jerusalem, Moab; Gilead; Nazareth; Damascus.

3. C. elegans, Desf. ⊙ .15 to .4, culms slender, naked above. Panicle ovate-oblong, *one-sided*, more open than 1 and 2, branches several times bifurcated, rather long; fertile spikelets *one- to two-flowered;* the others either all sterile, or *bearing fertile flowerets at summit;* glumes lanceolate at base, gradually tapering into an awl-shaped tip, longer than pale; awn of fertile pale 3-4 times its length; lower awns 3-5 times as long as sterile pales, *all straw-colored* — Spring — Dry places; coast to middle mountain zones.

61. KŒLERIA, Pers. Kœleria.

Spikelets compressed laterally, 2-5-flowered, the upper flowerets stipitate, all perfect or the uppermost tabescent. Glumes keeled, acutely, 1-3-nerved, as long as the flowerets or shorter. Lower pale keeled, 3-nerved, generally 2-toothed, usually furnished with a short, straight awn between the teeth — (Ours) Annuals; panicle spiked.

1. K. phleoides, Vill. ⊙ .3 to .4; culms numerous, erect or ascending. Leaves soft, hairy, flat, linear. Panicle sometimes lobulated; *lower glume somewhat shorter and narrower than upper;* awn usually much shorter than glabrous or puberulent pale, almost 0 on upper pales — Spring — Fields and waysides; common.

Var. **longe-aristata,** Post. Spikes .04 to .07 long, .008 to .01 broad; awns nearly or quite as long as lower pale — Beirût; Lebanon.

Var. **grandiflora,** Boiss. Spike .05 to .08 long, .015 to .02

broad, lobed, spikelet large; lower pale acute, with awn one-third to one-half its length.

Var. **condensata,** Boiss. Spike .02 to .08 long, .005 to .01 broad; spikelets small; lower pale short-awned, prominently nerved.

Var. **amblyantha,** Boiss. Spikes as in last; spikelets small; lower pale minute, elliptical, obtuse, muticous and very short-awned, often tubercled; nerves nearly obsolete.

2. K. Sinaica, Boiss. ⊙ .05; culms geniculate below. Leaves soft, linear, acuminate, flat, hirtulous. Panicle spike-like, oblong, somewhat lobed; glumes somewhat shorter than flowerets, oblong-lanceolate, *equal or the lower a little longer; pales glabrous;* the lower of the lowermost floweret oblong-lanceolate, entire at tip, short-awned, of upper flowerets bifid toward tip, *awn longer than pale* — Spring — Sinai.

62. MOLINIA, Schrank. Lavender Grass.

Spikelets laterally compressed, somewhat remotely 2-5-flowered, the uppermost floweret usually tabescent. Glumes membranous, concave, 1-nerved, shorter than flowerets. Lower pale herbaceous, 5-nerved, back convex, somewhat inflated at base, muticous, upper pale membranous, 2-keeled — Perennials; spikelets panicled.

M. cærulea, L. ♃ Lavender Grass. .3 to .6, tufted, with old stems and stumps of leaves at base; culms erect, striate, stiff, with a few leaves below, naked above. Leaves flat, linear, acuminate, scabrous-margined. Panicle .03 to .1 long, .006 to .01 broad, interrupted, branches nearly opposite; spikelets often *violet-colored;* glumes ovate-oblong, muticous, nearly equal; lower pale obtuse — August and September — Alpine Lebânon.

63. SPHENOPUS, Trin. Sphenopus.

Spikelets laterally compressed, 2-3-flowered, the flowerets somewhat remote, the uppermost sterile, jointed to the axis. Glumes unequal, membranous, continuous with pedicel and persistent. Pales membranous, muticous, the lower oblong, obtuse, concave, 3-1-nerved, the upper 2-lobed, scabrous at the two keels — Annuals; spikelets minute, in a diffuse panicle.

S. divaricatus, Gou. ⊙ .1 to .2; culms slender, geniculate at base, ascending. Leaves narrow-linear, channeled, at length involute. Panicle at first compact, then diffuse; pedicels cylindrical-club-shaped, crowned with the persistent glumes; glumes obtuse, shorter than flowerets, the upper thrice as long as the lower; lower pale scarious at tip, obtuse, somewhat keeled — Spring — Fields; common.

64. CATABROSA, P. de B. Whorl Grass.

Spikelets 2-3-4-flowered with or without a sterile stalk, the lower floweret sessile, the others stipitate, or 1-flowered. Glumes unequal or equal, shorter than flowerets. Pales membranous, about equal in length, the lower 3-nerved at least at base, obtuse or truncate-dentate; the upper 2-keeled, 2-lobed — Perennials, with aspect of Poa.

C. aquatica, L. ♃ .3 to .5, aquatic; root-stock creeping; culms prostrate or ascending, rooting below. Leaves broad-linear, obtuse. Panicle .15 to .2 long, oblong-pyramidal, branches whorled, at first ascending, then horizontal or deflexed; spikelets 2- (rarely 3-4-) flowered, the upper floweret stalked; glumes membranous at tip, much shorter

than flowerets, the lower ovate, obtuse, the upper obovate, obtuse, twice to thrice as long; lower pale 3-nerved, 3-keeled, truncate and eroded-denticulate at tip — April to August — In water; common.

Var. **chionophila,** Post. .02 to .04; panicle narrow, short — In rills from snowdrifts; top of Ḍohr-el-Qoḍîb.

65. ERAGROSTIS, P. de B. Eragrostis.

Spikelets pedicelled, laterally flattened, 3-∞-flowered, the flowerets 2-ranked, imbricated, perfect, with a persistent axis. Glumes membranous, keeled, 1-nerved, shorter than lower floweret. Pales muticous, membranous, the lower 3-nerved, concave, keeled, deciduous with the caryopsis; upper 2-keeled, usually persisting on the axis — Annuals or perennials; panicle diffuse or spiked.

* *Annuals; culms erect, procumbent, or geniculate-ascending. Leaves narrow-linear.*

1. E. poæoides, P. de B. ⊙ .2 to .4. Panicle ovate-oblong, .06 to .3 long, .03 to .1 broad, branches solitary; pedicels capillary, divergent, shorter than spikelets; spikelets .005 to .009 long, .0015 to .002 broad, lanceolate-oblong, 8-20-flowered; lower pale *elliptical*, obtuse — August and September — Fields and grassy places; common.

2. E. megastachya, Link. ⊙ .15 to .5. Panicle ovate-oblong, .05 to .15 long, .03 to .06 broad, branches usually solitary, pedicels much shorter than spikelets; spikelets clustered or solitary, oblong to oblong-linear, .006 to .015 long, .003 broad, 11-29-flowered; lower pale *oblong, retuse, often mucronulate* — May to September — Fields; coast to middle mountain zones; interior tablelands; Ghôr-eṣ-Ṣâfieh.

3. E. pilosa, L. ⊙ .4. Panicle oblong, .06 to .1 long, .01 to .02 broad, branches capillary, hairy at insertion, at length spreading, the lower often whorled, 3-5 together; pedicels capillary, as long as spikelets or *longer;* spikelets linear, .003 to .005 long, .0007 to .001 broad, 5-11-flowered, *purplish;* lower pale minute, oblong, acutish, with nerves slightly prominent — September — 'Ain-Zeḥalta (Lebanon); Ghôr-eṣ-Ṣâfieh.

4. E. Ægyptiaca, Del. ⊙ .15 to .3. Panicle *pale*, contracted, .05 long, .008 to .01 broad, linear-oblong, branches short, whorled, not ciliate at base; spikelets subsessile, linear, acute, .005 long, .001 broad, imbricated over each other, 15-20-flowered, the axis flexuous; lower pale oblong-lanceolate, obtusish, the lateral nerves prominent; upper pale curved — January to May — Sands; Gaza; Ghôr-eṣ-Ṣâfieh, and southward to Egypt.

Fig. 404.



(*a*) Tip of panicle of E. Ægyptiaca, over-ripe. (*b*) A spikelet, magnified 3 diams.

Fig. 405.



(*a*) Tip of panicle of Eragrostis cynosuroides. (*b*) A spikelet of the same magnified 2 diameters.

* * *Perennials, stout, erect; leaves linear, often .005 broad, convolute at tip.*

5. E. cynosuroides, R. et Sch. ♃ *Ḥalfâ. Bir'âm. Qakh.* 1 to 2, tufted; rootstock thick, creeping; culms terete, leafy.

Leaves 2-ranked, elongated. Panicle cylindrical, .25 to .3 long, spike-like, *bipinnate*, flattened; spikelets sessile along the stiff, hairy, sessile branches, imbricated, 6-12-flowered, oblong, .005 to .01 long, flattened; lower glume acute, shorter and narrower than upper; lower pale somewhat coriaceous, white or turningblackish, oblong-ovate, obtusish, keel scabrous, the lateral nerve somewhat prominent — December to March --Dry fields and waysides; Jaffa, and southward to Egypt; Ghôr-eṣ-Ṣâfieh.

66. MELICA, L. Melic Grass.

Spikelets laterally compressed, 2-5-flowered. The lower 1-2 flowerets perfect, the upper 1-3 sterile, tabescent, imbricated in a turbinate or oblong-cylindrical body. Glumes membranous, concave, as long as flowerets or shorter. Pales muticous, the lower somewhat cartilaginous, concave, the back 5-∞-nerved, the upper 2-keeled, 2-toothed at tip — Perennials, with creeping root-stock and tufted culms; leaves at length more or less convolute.

* *Lower pale glabrous.*

1. M. ramosa, Vill. ♃ .3 to .4. Leaves *convolute-filiform, stiff.* Panicle loose, pyramidal, branched, or simple and raceme-like, one-sided. Spikelets at length nodding, about 4-flowered, the upper 1-2 flowerets, sterile; glumes oblong-lanceolate, acutish, sometimes pinkish, scarious-margined, the upper somewhat longer, as long as flowerets or longer; lower pale lanceolate, punctate-scabrous at back, many-nerved, scarious and obtuse at tip — April to August —

Var. **vulgaris**, Panicle pyramidal. Leaves with ligules— -Palestine.

Var. **eligulata,** Boiss. Culms slender. Leaves without ligules. Racemes one-sided, .03 to .05 long — Rocks; coast to middle mountain zones.

Var. **parviflora,** Boiss. Spikelets few, racemed, small. Leaves filiform, with ligules — Middle Lebanon.

* * *Margin of lower pale or its whole outer surface villous.*

† *Sterile flowers glabrous. Spikelets* .007 *to* .008 *long.*

2. M. ciliata, L. ♃ .3 to .7. Panicle spike-like, .06 to .08 long, cylindrical, often lobed, branches short, appressed; spikelets ascending, 2-3-flowered, *the lower floweret only fertile;* glumes membranous, straw-colored, the lower oblong-lanceolate, apiculate, the upper longer, lanceolate, acuminate; lower pale lanceolate, acute, *glabrous and tubercled-scabrous at back, margin with yellowish-white villi as long as breadth of pale* — May to October — Antilebanon; Aintâb.

Var. **Nebrodensis**, Coss. Leaves involute. Spike few-flowered, one-sided; glumes more acuminate, *often reddish;* villi of lower pale white — Subalpine and Alpine Lebanon and Antilebanon; Amanus.

3. M. Cupani, Guss. ♃ .3 to .5. Panicle spike-like, .05 to .1 long, equal or somewhat one-sided, branches appressed; spikelets at length spreading, .007 to .01 long, 2-4-flowered, the upper 1-2 flowerets sterile, oblong to turbinate or cylindrical, *scabrous or glabrous;* glumes straw-colored or violet, the lower ovate, acute, the upper longer, lanceolate, acuminate. Lower pale *densely long-villous over the whole back* — May and June —

(*a*) *Sheaths and blades of leaves glabrous.*

Var. **typica,** Boiss. Spikes dense, equal or one-sided. The upper glume only one-third to one-fourth longer than lower.

Var. **viridis**, Boiss. Leaves convolute, slender. Spike one-sided. Lower glume scarcely one-quarter shorter than upper — Antilebanon; Lebanon.

Var. **inæquiglumis,** Boiss. Lower glume half or one-third as long as upper — Haurân; Antilebanon plateau; Antilebanon: Cœlesyria; Lebanon; Marash.

(*b*) *Leaves or only their sheaths hairy or woolly.*

Var. **pannosa,** Boiss. Spikes dense, nearly equal. Lower glume one-half to one-third as long as upper. Culms, sheaths, and leaves woolly-canescent — Antilebanon and Damascus plateaus to Ṣuf Dagh.

† † *Sterile floweret hirsute. Spikelets .01 long. Leaves glabrous, glaucescent.*

4. M. penicillaris, Boiss. et Bal. ♃ .5. Panicle spike-like, loose, .1 to .2 long, branches stiff, short, with 3-5 spikelets; spikelets .01 long, 3-flowered, *the upper sterile floweret hirsute;* glumes membranous, oblong, *nearly equal*, scarious-margined, a little shorter than flowerets; lower pale oblong, obtuse, *villous, with long hairs over the whole of the back* — September — Elmalu (northern Syria).

Species not sufficiently known.

5. M. capillaris, Russ. ♃ Panicle capillary, diffuse. Sterile flowerets not hirsute, cylindrical-subulate — Near Aleppo (Russell).

67. ÆLUROPUS, Trin. ÆLUROPUS.

Spikelets nearly sessile, 4-11-flowered, imbricated-clustered, the clusters forming an ovate-globular or oblong to linear-spike or head. Flowerets perfect, the uppermost tabescent. Rachis somewhat brittle, at length separating into joints. Glumes 2, unequal, shorter than flowerets, keeled, ovate-oblong, muticous or mucronate. Lower pale herbaceous, keeled, or convex at back, many-nerved, mucronate or somewhat awned; upper pale obtuse, 2-keeled.

Æ. littoralis, Willd. ♃ *Mulleiḥ. 'Akrikh. Najîl beledi.* Glabrous; culms procumbent, stoloniferous, sometimes hispidulous, rooting at joints, branching at nodes, leafy to tip, .05 to .3 high. Leaves glaucous, 2-ranked, rigid, somewhat ascending, linear-lanceolate, acuminate, .015 to .03 long, at length convolute-subulate. Spike oblong to cylindrical, at first .005 to .013 long, at length evolved and interrupted, .03 to .04 long; clusters nearly sessile; spikelets glabrous; glumes oblong, obtuse; lower pale oblong-lanceolate, obtuse or abruptly acuminate, mucronate — May to June — Places inundated in winter, especially salt meadows; Palmyrene Desert.

Var. **repens,** Coss. Glabrous except spikes, or white-tomentellous. Leaves .005 to .015 long; spike ovate to globular; spikelets 4-7-flowered; glumes and pale hirsute — Arabia Petræa, and eastward.

68. DACTYLIS, L. COCK'S FOOT GRASS. ORCHARD GRASS.

Spikelets 3-6-flowered, crowded in one-sided clusters, forming a dense, branching, spike-like, one-sided panicle. Flowerets perfect, the uppermost tabescent. Lower glume herbaceous, scarious-margined,

upper scarious, both keeled, mucronate. Lower pale herbaceous, keeled, notched at apex, long-mucronate, upper pale scarious, 2-keeled, bifid — Perennials.


FIG. 406.

Terminal head of Dactylis glomerata.

D. glomerata, L. ♃ .4 to .8. Leaves linear, flattened, green. Panicle interrupted, .03 to .06 long; clusters on short, erect or somewhat spreading branches — Spring and summer — Grassy places; common to subalpine region.

Var. **Hispanica,** Boiss. Leaves more or less glaucescent, narrow. Panicle spike-like, ovate to oblong, .01 to .02 long; spikelets nearly or quite sessile — In similar places to type.

69. SCLEROCHLOA, P. de B. Hard Grass.

Spikelets laterally compressed, 3-5-flowered, the flowerets imbricated, the uppermost tabescent. Glumes obtuse or retuse, unequal, much shorter than flowerets, scarious-margined. Pales persistent, the lower coriaceous, scarious-margined, keeled, obtuse, 5-nerved, the upper scarious, 2-keeled, obtuse — (Ours) Annuals, panicle oblong, spike-like, one-sided.

S. dura, L. ⊙ .1 to .3; culms tufted, prostrate, leafy to top. Leaves flat, linear, acute. Panicle .02 to .04 long, .01 broad, simple or short-branched; pedicels short, thick, triquetrous; spikelets .005 to .006 long, oblong-linear; the lower glumes 3- the upper 5-7-nerved; the lower pale 5-nerved — March to May — Fields and sandy places; Lebanon; Ḥemṣ; Aleppo; Qaryetein, and northward, and eastward.

70. BRIZA, L. Quaking Grass.

Spikelets many-flowered, flattened, ovate or cordate, with closely imbricated flowerets, all fertile. Glumes ventricose at back, nearly equal, orbicular, muticous, smaller than pales. Pales scarious, the lower ovate to orbicular, many-nerved, cordate at base, muticous; the upper much smaller, 2-keeled, round-obovate, flat — Annuals or perennials, with panicled, showy spikelets, borne on slender often drooping pedicels.

* *Perennials.*

1. B. minor, L. ♃ .3 to .4; culms solitary or tufted, often geniculate. Leaves flat, *broad-linear*, acuminate. Panicle erect, compound. .05 to .1 long, .03 to .08 broad, loose, branches capillary, 2-3-forked; spikelets *triangular*, .003 long and broad, 5-7-flowered; lower pale broader than long — April and May — Fields; coast to middle mountain zones; Jordan Valley.

* * *Annuals.*

2. B. spicata, S. et S. ⊙ .2 to .3; culms slender, geniculate, ascending. *Lower leaves awl-shaped, upper very narrow-linear.* Panicle *contracted, raceme-like, often simple*, .03 to .08 long, .01 to .02 broad, *all the branches except the lowest bearing a single spikelet*, and shorter than it; spikelets green, ovate or oblong, .003 to .006 long, .002 to .004 broad, acutish, 7-9-flowered — April and May — Rocky places, middle Lebanon and Antilebanon; Aintâb, and northward.

3. B. maxima, L. ⊙ .3 to .4; culms geniculate, ascending. Leaves broad-linear. Panicle *nearly simple, somewhat one-sided,* .04 to .1 long, .025 to .06 broad, nodding at apex, with slender, wavy branches. Spikelets *large,* ovate to ovate-oblong or oblong, pendulous, .008 to .02 long, .005 to .01 broad, 7-17-flowered, *straw-colored or reddish* — Spring — Grassy places, as high as middle mountain region; common. A most beautiful grass.

FIG. 407.

Spikelet of Briza maxima.

71. SCHISMUS, P. de B. SCHISMUS.

Spikelets 6-7-flowered, laterally compressed, the flowerets perfect; axis jointed, brittle. Glumes much longer than the lowest floweret, herbaceous, scarious-margined, lanceolate, nearly equal, the lower broader, 5-7-nerved, the upper 3-nerved. Lower pale obovate, concave, ∞-nerved, scarious-margined, 2-lobed, muticous or with a short awn at sinus; upper pale as long or shorter, oblong-spathulate, entire, 2-keeled below — Tufted annuals; leaves at length convolute-subulate, spikelets in an oblong spike, which (in ours) is .015 to .03 long, acutish at both ends.

1. S. calycinus, L. ⊙ *Behmeh. Safsûf.* .1 to .15. Pedicels one-half to one-third as long as spikelets; glumes *acute;* lower pale *short-hairy* at margin or all over back, or *rarely glabrous;* lobes obtuse, *one-fifth* as long as pale; awn short or 0; upper pale nearly as long as lower — Spring — Sinai; Jordan Valley; Cœlesyria; Palmyrene Desert

2. S. Arabicus, Nees. ⊙ *Abu-Machi.* .1 to .2. Pedicels one-half to one-fourth as long as spikelets; glumes *acuminate;* lower pale *silky hirsute, bifid to one-third or one-half its length, lobes acute;* awn obsolete; upper pale two-thirds as long as lower — Spring -- Sandy places; Sinai; Jordan Valley; Damascus; Aleppo.

72. POA, L. MEADOW GRASS. SPEAR GRASS.

Spikelets pedicelled, laterally compressed, 2-∞-flowered, the flowerets perfect. Glumes keeled, shorter than flowerets, nearly equal or the lower smaller. Lower pale 2-keeled, 2-lobed, at length deciduous with the upper pale — Annuals or perennials, the spikelets in a more or less open panicle.

* *Lower pale 5-nerved.*

† *Lateral nerves of lower pale prominent.*

‡ *Lower pale glabrous; tufted alpine and subalpine perennials.*

1. P. diversifolia, Boiss. et Bal. ♃ .3 to .6. Leaves of sterile clusters with a dilated sheath, slender, involute, .06 to .15 long; cauline leaves broader and flatter. Panicle erect, .05 to .1 long, .008 to .02 broad; spikelets 3-5-flowered, .005 to .007 long, green or reddish; glumes lanceolate, acute, the lower 1-nerved, the upper longer, 3-nerved, nearly as long as lower flowerets; lower pale lanceolate, glabrous, scabridulous, keeled, obtuse — May to August — Subalpine and alpine Lebanon.

Var. **crassipes,** Hackel. Base of culms bulbous-dilated. Leaves nearly alike. Panicle narrow. Branches and spikelets few.

‡ *Lower pale usually silky-hairy at keel and margins.*

2. P. annua, L. ⊙ ② Low Spear Grass. .1 to .25, tufted;

root fibrous; culms flaccid, somewhat decumbent or ascending, often rooting or stoloniferous at base. Leaves flaccid, linear, flat. Panicle somewhat one-sided, .03 to .05 long, .02 to .04 broad, loose, branches solitary or twin, spreading or reflexed; spikelets ovate to oblong, 3-5-flowered, .002 to .003 long, green or variegated with violet; glumes unequal, oblong-lanceolate, acutish or obtuse, keel smooth; lower pale rather obtuse, scarious-margined, glabrous, or pubescent-sericeous at margins and keel — All the year — Fields and roadsides; common.

2. P. pratensis, L. ♃ .3 to .4; root-stock creeping by long stolons; culms erect, terete. Leaves linear, flat, the radical often convolute, much narrower. Panicle erect, oblong, .06 to .09 long, .03 broad, branches scabrous, at length spreading, 4-5 together; spikelets oblong-ovate, .003 to .005 long, .0015 broad; flowerets 3-5, *connected by long, interlacing fleece*, glumes nearly equal, acute, with scabrous keel; lower pale acute, scarious-margined, *the keel and margins and nerve pubescent-silky* — Spring — Fields; common.

3. P. trivialis, L. ♃ .3 to .6; root fibrous; culms terete, somewhat flattened, *usually scabrous above.* Leaves flaccid, linear, flat. Panicle erect or nodding at tip, .05 to .2 long, .02 to .03 broad, branches scabrous, the lower as many as five in a whorl; spikelets ovate, .002 to .003 long, green or reddish, 3-4-flowered; *fleece little or* 0; glumes unequal, lanceolate, mucronate; lower pale lanceolate, acute, somewhat silky at keel, the lateral nerves prominent — April to June — Fields and woods; common.

† † *Lateral nerves of lower pale obsolete.*

4. P. compressa, L. ♃ .3 to .6; root-stock creeping, stoloniferous; culms geniculate or procumbent. Leaves linear, glaucous. Panicle erect, oblong, *contracted before and after flowering*, .05 to .06 long, .008 broad, branches short, the lower 2-3 together; spikelets ovate-oblong, .004 to .005 long, green or variegated; flowerets 5-9, *somewhat* connected at base by *sparse* fleece; glumes nearly equal, oblong, acute; lower pale oblong, obtuse at scarious tip, silky toward base of keel and margins — April to September — Dry places and roadsides; coast to subalpine Lebanon; Gilead.

FIG. 408.



Floweret of Poa compressa. 5 diameters.

5. P. bulbosa, L. ♃ .2 to .4; tufted, root fibrous; culms erect, often bulbous at base. Leaves linear, flat, acute. Panicle ovate to oblong, .02 to .06 long, .01 to .04 broad, dense, branches short, solitary or twin; spikelets ovate, 4-7-flowered, .003 long, white or variegated; glumes nearly equal, oblong, acute; flowerets imbricated, *connected by long, interlacing fleece;* lower pale oblong, scarious at tip, acute, silky all over or at keel and margins — Spring — Hillsides and rocky places; common throughout. Often viviparous.

6. P. Sinaica, Steud. ♃ .2 to .3; root fibrous; culms erect, tufted, often bulbous at base. Leaves *linear-setaceous* or convolute. Panicle oblong, .02 to .05 long, .01 broad, compact, branches short, stiff, 2-3 together; spikelets crowded, ovate-oblong, .003 to .004 long, white, glossy; flowerets 5-6, slightly or *not at all connected by fleece;* glumes nearly equal, ovate-oblong, acute, with scabrous keel; lower pale oblong, acutish, *more or less pruinose-scabrous* — Spring — Et-Tîh; Sinai; Syrian Desert; Nebk to Qaryetein. Very near the last.

7. P. Timoleontis, Held. ♃ .1 to .2; root fibrous; culms tufted, slender, bulbous-expanded at base. Leaves convolute-setaceous, scabrous. Panicle .015 to .02 long, ovate, dense, branches short, scabrous, solitary or twin; spikelets ovate, 6-10 flowered, .006 long; glumes oblong, nearly equal, acuminate; *axis not fleecy;* lower pale oblong, acutish, scarious at margins and tip, *silky at keels and margins* — April — Jebel Qasyûn (Damascus); between el-Beida and el-Jebâh (Syrian Desert).

Fig. 409.



Panicle of P. Timoleontis.

8. P. macroglossa, Hackel (in letter). ♃ .12 to .2; root fibrous; culms tufted, slender, bulbous-expanded at base, sheathed with root-leaves, leafy only one-third their length. Leaves convolute-filiform, scabrous; ligule lanceolate, scarious, long-acuminate, that of radical leaves long-exserted. Panicle ovate to oblong, .015 to .03 long, .01 to .015 broad, compact, branches short, scabrous, solitary or the lower twin; spikelets oblong, .004 long, 3-4-flowered; glumes nearly equal, ovate, mucronate; axis not fleecy; lower pale *reddish-purple*, oblong, scarious-margined, mucronate, *glabrous throughout*—May—Aintâb.

The only specimens thus far seen are the so called viviparous forms.

9. P. nemoralis, L. ♃ .5 to .8; root fibrous; culms slender, leafy to top. Leaves linear, acute, with short ligule or 0. Panicle oblong, .1 to .15 long, at first spreading somewhat then contracted; branches capillary, scabrous, 5-2 together in whorls; spikelets ovate-lanceolate, green, 2-5-flowered; flowerets with little or no fleece; glumes nearly equal, lanceolate, acute, keel scabrous, margins narrow-membranous; lower pale lanceolate, scarious at tip, obtusish, pubescent toward base of keel and margins — August — Woods; Amanus.

* * *Lower pale oblong, obsoletely 3-nerved toward base.*

10. P. Persica, Trin. ⊙ .3 to .6; culms usually numerous, slender, erect, leafy. Leaves narrow-linear. Panicle ovate-oblong, .1 to .2 long, branches capillary, whorled, 6-10 together, spreading; pedicels stiff, scabrous, usually longer than spikelet; spikelets oblong, .005 to .006 long, loosely 3-13-flowered; glumes lanceolate, acute, the lower 1-nerved, about half as long and broad as upper, which is 3-nerved and shorter than the nearest floweret; lower pale glabrous or puberulent, *obliquely truncate* at hyaline tip, with or without mucro — Spring — Sandy and dry places; common.

Var. **alpina,** Boiss. .03 to .1. Branches of panicle longer. Spikelets 2-5-flowered. Lower pale usually acute — Alpine regions of Lebanon and Hermon.

Var. **major,** Boiss. Spikelets 7-15-flowered, .006 to .009 long, flowerets more scattered. Lower pale obtuse — Fields and waysides.

73. GLYCERIA, R. Br. Sweet Grass.

Spikelets (in ours) 7-13-flowered, more or less laterally compressed, rachis brittle. Glumes concave, obtuse, muticous, unequal, shorter than flowerets. Pales deciduous together, muticous, the lower concave, not keeled, obtuse, 5-7-nerved, the upper membranous, 2-keeled, bifid at tip, the keels ciliolate—Perennials; root-stock creeping; culms rooting at base. Leaves broad-linear, flat, the lower often floating; panicles (in ours) .2 to .3 long, .04 to .06 broad; spikelets .01 to .02 long.

1. G. fluitans, L. ♃ Floating Sweet Grass. .5 to .7. Panicle somewhat one-sided; spikelets oblong-linear; lower glume half to two-thirds as long as upper; lower pale oblong, *obtuse or acutish*, tip scarious — Summer — In water; Cœlesyria; Hermon.

2. G. plicata, Fries. ♃ .5 to .7. Panicle more or less whorled; spikelets linear-cylindrical; lower glume about half as long as upper; lower pale ovate-oblong, with a broad, scarious, *sinuate-crenate* tip — Summer — In water. Probably only a variety of the last.

74. ATROPIS, Rupr. Atropis.

Spikelets ∞- or 2-3-flowered, laterally compressed; rachis brittle. Glumes obtuse, concave, muticous, unequal, shorter than flowerets. Pales deciduous together, muticous, nearly equal in length, the lower concave, not keeled, obtuse or truncate, 5-nerved, the upper membranous, 2-keeled, ciliolate at keels — Perennials, with narrow panicles of spikelets resembling those of Poa.

A. distans, L. ♃ .2 to .4; glaucous; root fibrous, not stoloniferous; culms erect or ascending, often geniculate. Leaves firm, linear, rather broad. Panicle erect, oblong-pyramidal, .1 to .15 long, branches naked below, spreading in flower, becoming deflexed in fruit; spikelets oblong, 4-6-flowered, .005 long, .01 broad; glumes scarious at margin, ovate, obtuse — Summer — Salt marshes; Syrian Desert between Hamath and Palmyra.

Var. **humilis**, Hackel (in letter). .05 to .1. Leaves narrow, convolute-filiform. Panicle .05 long, .005 broad; spikelets and pales smaller, scarcely nerved; lower pale obliquely truncate, eroded-denticulate — In water from melting snow; summit of Ḍohr-el-Qoḍîb. Growing with dwarf specimens of Catabrosa aquatica, but readily distinguished by the number of flowerets (4-5) in spikelet.

75. FESTUCA, L. Fescue-Grass.

Spikelets 2-∞-flowered, panicled or racemed, the flowerets fertile, except the upper which is rudimentary. Glumes unequal, the lower 1- and the upper 2-3-nerved. Lower pale herbaceous, muticous or awned, not keeled, more or less prominently 5-nerved. Upper pale scarious, 2-keeled and 2-toothed, generally adherent to caryopsis – Perennials.

* *Ligules truncate, two-auricled. Lamina of leaves either all folded together, or those of culm more or less flat, conduplicate in vernation. Lower pale with a narrow, scarious margin.*

1. F. ovina, L. ♃ Tufted; root fibrous. Sheaths entire or more or less deeply cleft, the entire part not grooved; laminæ of all the leaves similar, more or less folded, 3-9-nerved. Panicle spreading during flowering; spikelets 4-8-flowered, flowerets lanceolate, muticous or short-aristate; ovary glabrous; caryopsis *deeply channeled on its ventral surface* —

(1) **pinifolia,** Hackel. .05 to .3. Sheaths *entire*, membranous, soon marcescent and irregularly fibrous; laminæ short, glaucescent, rigid, pungent, 5-nerved, 3-ribbed within; auricles of ligule acute. Panicle contracted, interrupted, .02 to .06 long, .006 to .008 broad; spikelets and rachis pruinose; lower glume short-aristate — June to September — Subalpine and alpine Lebanon.

(2) **sulcata,** Hackel. Sheaths *divided nearly to base,* marcescent, not fibrous. Laminæ obtuse, 5-nerved, compressed in drying, more or less deeply sulcate at sides.

(*a*) **Valesiaca,** Koch. .2 to .3; culms slender. Lamina glaucous, glabrous or pruinose, capillary. Panicle dense, .05 long, .005 to .006 broad; spikelets glaucous-pruinose; glumes and lower pale lanceolate-subulate, the latter short-aristate — Summer — Natural Bridge (Lebanon).

(3) **lævis,** Hackel. Sheaths smooth, *entire to or beyond middle,* at length more or less fibrous at least at base. Laminæ smooth, obtuse, compressed in drying, grooved at sides, with elevated margins.

(*a*) **genuina,** Boiss. Tall or rarely low. Laminæ bristle-like or rush-like. Panicle oblong to linear-oblong; spikelets oblong-elliptical; *awn of pale half its length* -- Summer — Mt. Cassius.

* * *Ligules truncate, destitute of auricles, or the mouth of the sheath prolonged into sickle-shaped auricles. Laminæ of leaves usually flat, convolute in vernation. Lower pale scarious toward tip, involute in fruit.*

2. F. elatior, L. ♃ 1 or more, tufted. Sterile leaf-clusters usually outside of sheaths, curved at base, sometimes creeping a little way, few-leaved; culms terete; sheaths of leaves split to base; ligule short, truncate-shreddy; laminæ alike, linear-lanceolate, *flat,* more or less convolute in drying, acute, many-nerved, scabrous toward tip. Panicle loose, .1 to .2 long, spreading in flower, more compact in fruit; spikelets oblong to elliptical, .005 to .008 long; glumes nearly equal; lower pale muticous or short-aristate — April and May —

Var. **pratensis,** Hackel. Lamina rarely auricled at base. Spikelets 7-8-flowered — Fields; especially in middle mountain zones.

Var. **arundinacea,** Hackel. Lamina auricled at base. Spikelets 4-5-flowered — Lebanon, Cœlesyria and Antilebanon; Gilead; Moab; Haurân; Damascus.

76. VULPIA, Gmel. Vulpia. Fox Grass.

Spikelets on pedicels thickened from base or above, or subsessile, several-flowered, the flowerets diverging, the upper often tabescent. Glumes keeled, acuminate. Lower pale lanceolate-linear, tapering from an entire apex into a long awn, keeled, rarely convex at back; upper pale 2-keeled, 2-toothed — Tufted annuals, the spikelets in a contracted, spike-like panicle or raceme. Leaves more or less convolute or folded.

* *Pedicels thickened above; fertile flowerets usually numerous in spikelet; glumes unequal; lower pale long-aristate. Caryopsis tapering at both ends.*

1. V. myuros, Auct. ⊙ .2 to .5. Uppermost leaves near or at base of panicle. Panicle spike-like, .03 to .15 long, .006 to .01 broad, one-sided, somewhat curved and nodding, branches appressed; pedicels very short, compressed, spikelets 4-6-flowered, most of the flowerets fertile; glumes linear, setaceous-acuminate, *the lower one-third as long as the upper, which is half as long as the adjacent* floweret; lower pale linear-lanceolate, *scabrous at tip or all over,* ending in an awn twice as long as itself — Spring — Arabia Petræa; Bikfayah (Lebanon).

2. V. sciuroides, Roth. ⊙ .2 to .3. Uppermost leaves *remote from panicle.* Panicle short, erect, sometimes simple, the lower branch-

es sometimes half as long as panicle; pedicels short, flattened, rough; glumes linear, setaceous-acuminate, *the lower half as long as the upper, which is scarcely shorter than the adjacent floweret;* lower pale linear-lanceolate, *scabrous toward tip or all over*, ending in an awn once and a half to twice its length — May and June — Beit-Meri; Neba'-el-Ḥadîd (Lebanon).

Var. **minutigluma,** Post. *Lower glume minute* — Ḥaurân.

3. V. ciliata, Pers. ⊙ .3. Panicle contracted, oblong, .03 to .07 long, .01 to .015 broad, branches appressed, pedicels short; spikelets 4-6-flowered, the lowermost floweret only fertile as a rule; glumes glabrous, lanceolate-subulate, the lower minute or 0, the upper *one-fourth to one-third as long as next pale;* lower pale lanceolate, keeled, *villous-ciliate at base and margin or all over*, ending in an awn about twice its length — Spring — Syrian coast.

Var. **plumosa,** Boiss. Spikelets 3-flowered, flowerets spirally arranged; upper glume minute. Lower pale longer-ciliate — Jebel Naḥḥâs (Aleppo), and eastward.

4. V. uniglumis, Sol. ⊙ .3 to .4. Upper leaves often near the panicle, and sometimes forming an involucre to it. Panicle oblong, .05 to .08 long, .01 to .02 broad, one-sided, nearly simple, branches short, stiff; pedicels rather long, compressed, thickened from base to tip; spikelets 4-7-flowered; lower glume minute or 0, upper *nearly as long as adjacent pale, long-awned;* lower pale linear-lanceolate, *glabrous at back, scabrous at keel and margins and tip*, ending in a scabrous awn *as long as or longer than itself* — Spring — Sands; coast.

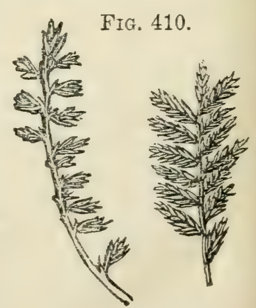
* * *Pedicels thickened above; the lowest floweret of the spikelet only fertile, the rest reduced to pales gradually less in size, in 2-ranks or spirally crowded in a stipitate cluster. All the lower pales long-aristate. Caryopsis rounded at tip.*

5. V. inops, Del. ⊙ .05 to .15. Panicle ovate to oblong, .03 to .05 long, .006 to .015 broad, dense; branches short, thick; pedicels short, flattened; glumes *equal in length*, glabrous or hirsute, *the lower subulate, the upper linear-lanceolate, both ending in a long awn;* lower pale of fertile floweret glabrous or hirsute, *its awn with those of the glumes overtopping the awns of the sterile flowerets;* upper flowerets of sterile cluster reduced to awns — Spring — Deserts from Sinai to Palmyra.

* * * *Spikelets nearly sessile, on node-like pedicels, the fertile flowerets numerous. Glumes very unequal, the lower often obsolete. Lower pale mucronate-aristate. Caryopsis tapering at both ends.*

6. V. pectinella, Del. ⊙ *Abu-Dhuneibah.* .05 to .3. Panicle spike-like, .02 to .03 long, .008 broad, one-sided, simple, or with one or two spreading branches at base; spikelets 2-ranked, spreading, oblong, .004 to .006 long, .002 broad, 3-8-flowered; lower glume minute, scale-like, ovate-triangular, upper coriaceous, concave, linear, mucronate, convex at back, half as long as adjacent floweret; flowerets loosely racemed

FIG. 410.



Spikes of Vulpia pectinella.

along the scarcely thickened axis; lower pale coriaceous, linear, involute, scarcely keeled, *tapering into an awn-like mucro* — Spring — Sands; et-Tîh, near southern borders of Palestine; Palmyra.

77. NARDURUS, Rchb. Nardurus.

Spikelets subsessile, or with short, thick pedicels, compressed, solitary and alternate, lying obliquely in excavations of the rachis, several-flowered, the flowerets diverging. Glumes equal or unequal. Lower pale concave, not keeled, lanceolate, muticous or awned; upper pale 2-toothed, 2-keeled, scabrous at keels — Tufted annuals; spikelets in a simple spike; leaves narrow-linear, convolute.

1. N. tenuiflorus, Schrad. ⊙ .1 to .2. Spike .05 to .14 long, .005 broad, erect or incurved, 2-ranked or one-sided, *interrupted;* pedicels very short; spikelets 5-6-flowered; glumes lanceolate-linear, keeled, acuminate, the lower shorter, 1-nerved, the upper 3-nerved, half as long as spikelet, *a little shorter than the adjacent floweret;* lower pale *linear-lanceolate*, acuminate, ending in a mucro or *extended into an awn as long as or longer than itself* — April — Sandy and grassy places; Damascus to Palmyra, Aleppo, Aintâb, and northward, and eastward; Lebanon near Afqa.

2. N. Orientalis, Boiss. ⊙ .1. Uppermost leaf forming a spathe-like sheath to the spike. Spike .03 to .05 long, .004 broad, 2-ranked; spikelets sessile, 3-5-flowered; glumes indurated, lanceolate-linear, acuminate, nearly equal, rounded at back, scabrous, *longer than flowerets;* lower pale *elliptical*, acute, muticous or *short-awned a little below tip*—April—Antilebanon; Damascus; Aleppo; Syrian Desert.

Fig. 411.



Spike of Nardurus Orientalis.

78. CATAPODIUM, Link. Catapodium.

Spikelets ovate-oblong, rarely oblong-lanceolate, nearly sessile, lying edgewise in excavations of the rachis, several-flowered, compressed laterally. Glumes somewhat coriaceous, shorter than lowest floweret. Lower pale many-nerved, somewhat coriaceous, concave, obtuse, muticous; upper 2-keeled, 2-toothed, the keels ciliate — Annual herbs, with spikelets in a simple or branched spike. Doubtfully distinguished from Nardurus.

1. C. loliaceum, Huds. ⊙ .3 to .6, decumbent or prostrate, branching below, thickish, leafy. Leaves linear, flat, acute. Spike simple or branching below, stiff, one-sided, 2-ranked; spikelets erect, oblong, .015 to .02 long, .004 broad, 7-19-flowered; lower pale elliptical-lanceolate, obtuse, *glabrous*, somewhat scarious at itp — Spring — Sands; Syrian coast.

2. C. tuberculosum, Moris. ⊙ .4 to 1, erect. Leaves linear, .005 to .006 broad, strongly nerved, flexuous. Panicle rigid, simple, or with a few, *simple and distant branches;* branches and terminal spike .05 to .07 long, with 2-ranked spikelets on very short, thick pedicels; spikelets oblong-lenticular, .007 to .012 long, .002 to .003 broad, 6-15-flowered, erect; lower pale oblong-lanceolate, obtuse, muticous, prominently 5-nerved, *beset with tubercles* — April — Jericho.

Var. **pauciflorum,** Post. Spikelets .005 to .007 long, 3-6-flowered. New Bridge (Jordan).

77. SCLEROPOA, Griseb. Scleropoa.

Spikelets short-pedicelled, compressed, or linear-terete, flowerets 3-∞, imbricated. Glumes nearly equal, keeled, obtuse to retuse or acute, shorter than spikelets. Lower pale usually somewhat coriaceous, keeled, muticous or mucronate-aristate, 5-3-1-nerved, upper pale shorter, acutish, 2-keeled — Tufted annuals, with spikelets in stiff, 1-sided or forked panicles.

* *Spikelets broad, flattened. Panicle somewhat 1-sided.*

1. S. Philistæa, Boiss. ⊙ .1 to .2. Leaves linear, setaceous-acuminate, short, the upper remote from panicle. Panicle oblong-elliptical, usually purplish, .05 to .08 long, .03 to .04 broad, the lower branches with 3-5 spikelets; spikelets .006 to .01 long, .002 to .003 broad, *oblong-elliptical*, *obtuse*, 9-13-flowered, tapering at base; glumes oblong, the lower shorter, 1-nerved, the upper 3-nerved; lower pale oblong, obtuse, obsoletely mucronate, hirtulous toward base, *lateral nerves obsolete* — Spring — Sands; coast.

2. S. maritima, L. ⊙ .3 to .5, *glaucous*. Leaves rigid, narrow-linear, at length convolute, the upper often sheathing the base of the panicle. Panicle oblong-ovate, .08 to .1 long, .04 to .05 broad, compound, branches thick, triquetrous, forked, often with nearly sessile spikelets at forks; pedicels flattened, spikelets 5-9-flowered, *oblong-linear*, *acute*, .01 to .012 long, .0015 to .002 broad; glumes oblong, keeled, the lower 3-nerved, shorter, the upper 5-nerved; lower pale coriaceous, oblong-lanceolate, obtusish, mucronulate, *the lateral pair of nerves close to one another and to the margin* — Spring — Sands; coast.

* * *Spikelets narrow, linear-oblong to linear.*

† *Branches of panicle not jointed, spikelets at forks* 0. *Glumes obtuse.*

3. S. procumbens, Curt. ⊙ .1 to .2. Leaves linear, acuminate. Panicle rigid, oblong, contracted, *branches and pedicels very short*, 3-angled; spikelets 5-9-flowered, oblong-linear, .005 long, .0015 to .002 broad; glumes unequal, oblong, the lower 1-nerved, shorter, the upper 3-nerved; lower pale oblong, obtuse, *prominently* 5-*nerved and grooved* — Spring — Salt marshes between Hamath and Palmyra.

4. S. rigida, L. ⊙ .1 to .3. Leaves linear, acuminate. Panicle rigid, oblong-lanceolate, .05 to .1 long, .01 to .03 broad, with branches and pedicels 3-angled; spikelets 5-11-flowered, linear-oblong, .005 to to .01 long, .002 broad, loose, *pedicellate*; glumes lanceolate; lower pale oblong, convolute, *obsoletely keeled and nerved* — Spring — Grassy places and roadsides; everywhere.

†† *Branches of panicle jointed, brittle, bearing spikelets at forks. Glumes acute.*

5. S. Memphitica, Spreng. ⊙ .1 to .2. Sheaths of leaves dilated, open, the uppermost often forming a spathe to the panicle. Panicle *oblong*, *straggling*, .05 to .08 or .1 long, .01 to .03 broad, forked, *the spikelets at first erect, at length at angles* from 60°-130°, linear, acute at both ends, .007 to .01 long, .001

Fig. 412.

Tip of panicle of Scleropoa Memphitica.

to .0015 broad; glumes lanceolate, keeled, more or less unequal; lower pales appressed, lanceolate, acute or acuminate, mucronate or aristulate, keeled, 3-nerved — Spring — Sands; coast to middle mountain zone; Sinai to Deserts about Dead Sea, Palmyra, and north-eastward. Varies by insensible gradations into **S. dichotoma,** Forsk.

80. BROMUS, L. Brome Grass.

Spikelets pedicelled, more or less laterally compressed, many-flowered, the upper flowerets often tabescent, the axis brittle. Glumes usually unequal, shorter than the adjacent floweret, usually keeled. Lower pale herbaceous, concave or keeled, usually bidentate or bifid at tip, aristate at or below tip, rarely muticous; upper pale membranous, 2-keeled, entire or retuse, pectinate at keels with stiff hairs — Annuals or perennials, panicles more or less open.

* *Glumes unequal, the lower 1-nerved, the upper 3-nerved.*

† *Perennials. Spikelets after flowering scarcely broader at tip. Root fibrous.*

‡ *Sheaths of marcescent root-leaves, entire or split into parallel fibres.*

1 B. erectus.

‡ ‡ *Sheaths of marcescent root-leaves split into reticulated fibres.*

2 B. tomentellus.

† † *Annuals. Spikelets after flowering broader at tip.*

3 B. tectorum, 4 sterilis, 5 flabellatus, 6 Haussknechtii, 7 Matritensis, 8 rigidus, 9 rubens, 10 fasciculatus.

* * *Glumes nearly equal or unequal. Spikelets even after flowering narrower toward tip.*

† *Flowerets, even in fruit, imbricated.*

‡ *Margin of lower pale more or less convex not angled.*

11 B. scoparius, 12 alopecurus.

‡ ‡ *Margin of lower pale forming an obtuse angle at or above middle.*

13 B. squarrosus, 14 macrostachys, 15 intermedius, 16 mollis, 17 brachystachys.

† † *Flowerets in fruit not imbricated. Margin of lower pale obtuse-angled.*

18 B. patulus.

* * * *Species not sufficiently known.*

19 B. pulchellus.

1. B. erectus, Huds. ♃ .6 to 1.5, erect, rigid. Lower leaves linear, narrow, *sparingly hairy*, plicate; culm-leaves broader, flat. Panicle erect-lanceolate, .15 to .2 long, branches slender, scabrous, the lower 3-6 in a half-whorl; spikelets 3-8-flowered, linear-lanceolate, .02 to .025 long, .005 to .006 broad when open, glumes linear-lanceolate, acute; lower pale glabrous, linear-lanceolate, 5-7-nerved, 2-toothed at tip, with a straight awn *half to three-fourth its length* — April to June —

Var. **Syriacus,** Boiss. Leaves less unequal, the lowest long, flaccid. Panicle looser, the lower branches spreading — Fields and rocky places; coast to middle zone of mountains.

2. B. tomentellus, Boiss. ♃ .5 to .6, erect, rigid. Lower

leaves linear, narrow, flat, *more or less densely velvety and also loosely ciliate;* culm-leaves small. Panicle erect, oblong, .05 to .1 long, .02 to .03 broad, branches 1-3 together, shorter to longer than spikelet; spikelets pale, 6-9-flowered, oblong, .02 to .03 long, .01 broad when open; glumes linear-lanceolate, acuminate; lower pale linear-lanceolate, *more or less densely puberulent*, obsoletely 5-nerved, acutely 2-toothed at tip, with a straight or bent awn nearly or quite as long as itself — May to July — Alpine and subalpine Lebanon and Hermon; top of el-Qulêb and el-Jowâlîl (Ḥaurân); Marash.

3. **B. tectorum**, L. ⊙ .1 to .5, erect or ascending, *pubescent above.* Panicle short, *somewhat one-sided, pendulous*, with capillary branches; spikelets with awns .03 to .04 long, 5-9-flowered, *pubescent*, rarely glabrous, linear; glumes lanceolate, scarious at margins and tip; lower pale linear-lanceolate, as long as or a little shorter than the straight awn — Spring — Dry places, especially roofs and walls; everywhere.

4. **B. sterilis**, L. ⊙ .3 to .5, erect, glabrous. Panicle loose, nearly simple; peduncles slender, drooping, *longer than spikelet;* spikelets with awns .06 long, *glabrous or pubescent-scabrous*, 6-10-flowered; glumes linear-lanceolate, long-acuminate, lower more than half as long as upper; pales *often turning dark-purple; the lower many-nerved, shorter than awn* — Spring — Fields and waysides; everywhere.

5. **B. flabellatus,** Hackel. ⊙ .3, erect, minutely puberulent above. Leaves puberulent, linear, acuminate. Panicle *obovate-oblong, fan-shaped*, .07 to .08 long, .04 wide, dense, *branches much shorter than spikelets, erect;* spikelets pale, 4-8-flowered, glabrous or puberulent-scabrous; glumes linear-lanceolate, acuminate; lower pale linear-lanceolate, 5-nerved, the lateral nerves near together; awn as long as pale or a little longer — Spring — Fields and dry places; Sinai; Jerusalem; Ladder of Tyre; Syrian coast; Aintâb.

6. **B. Hausskneclitii,** Boiss. ⊙ .3, erect. Leaves flaccid, soft-pubescent. Panicle erect, oblong-lanceolate, branches erect, shorter than spikelets or as long; spikelets 5-7-flowered; glumes linear-lanceolate, long-acuminate; lower pale appressed-hirsute, linear-lanceolate, .01 long, keeled, about 5-nerved, long-bidentate below tip; awn once and a half as long as pale — Spring — Jebel-el-Qulêb (Ḥaurân). *Distinguished by its short spikelets and pales.*

7. **B. Matritensis,** L. ⊙ .3 to .4, erect. Panicle nearly simple, oblong; peduncles *short, or as long as spikelets, erect, or the lower ones somewhat recurved;* spikelets glabrous or pubescent, 5-12-flowered, .04 to .05 long; glumes linear-lanceolate, acuminate, lower half as long as upper; pales *generally green, the lower with more or less prominent lateral nerves*, about *as long as awn* — Spring — Fields and waysides; everywhere.

Var. **purpurascens,** Post. Glumes and pales purplish — With type (*B. purpurascens*, Del.)

Var. **Delilei,** Boiss. Low. Panicle dense, obovate-oblong; spikelets .01 to .02 long, exclusive of awns; flowerets small — Et-Tîh, near Palestine; Sinai; Palmyra.

8. **B. rigidus,** Roth. ⊙ .3 to .5, rigid, hairy above. Leaves hairy. Panicle oblong, erect, simple; spikelets 6-8-flowered, glabrous,

or pubescent, .06 to .08 long; glumes unequal, linear-lanceolate, acuminate, scarious-margined; lower pale linear-lanceolate, acuminate, keeled, with about 5 prominent nerves, *less than half as long as awn* — Spring — Fields and waste places; coast.

9. B. rubens, L. ⊙ .2 to .3, erect, pubescent above. Panicle erect, *compact*, *obovate*, with very short branches; spikelets pubescent or glabrous, *terete*, slightly flattened, 4-8-flowered, upper flowerets generally sterile; glumes lanceolate, acuminate, unequal, the upper twice as broad as the lower; lower pale 5-7-*nerved*, scarious at margin, acutely bifid; awn about as long as pale, *at length curved outward* — Spring — Fields and roadsides; coast to subalpine regions, and southward to the Tîh and Sinai; Gilead.

10. B. fasciculatus, Presl. ⊙ .2 to .3, erect, glabrous. Panicle erect, compact, obovate-cuneate, with short, stiff branches; spikelets *glabrous*, rarely puberulent, flattened, few, loosely 8-10-flowered, the upper 1-2 flowerets sterile; glumes linear-lanceolate, acuminate, unequal; lower pale linear-awl-shaped, keeled, as long as its somewhat twisted awn; *lateral nerves obsolete* — Spring — Waste fields; Syria and Palestine; Dead Sea; Damascus; Antilebanon.

11. B. scoparius, L. ⊙ .2 to .4, ascending, glabrous. Panicle erect, *dense*, *ovate to oblong*, .04 long, .001 to .025 broad, obtuse, with very short branches; spikelets pubescent or glabrous, 6-8-flowered; glumes lanceolate, acutish, scarious-margined, somewhat unequal; lower pale oblong, scarious-margined, short-bifid, nearly as long as its spreading, *at length twisted awn* — Spring — Common everywhere.

12. B. alopecurus, Poir. ⊙ .4, geniculate-ascending. Panicle erect, *cylindrical*, .1 long, .01 broad, often interrupted below, dense, branches short, appressed; spikelets pubescent, linear-lanceolate, 8-15-flowered; glumes unequal; lower pale lanceolate-linear, membranous-margined, acutely bifid, *shorter than the spreading, twisted awn* — Spring — Fields; coast to middle mountain zones; Hûleh.

13. B. squarrosus, L. .1 to .2; culms slender, glabrous. Panicle loose, simple, nodding, somewhat one-sided, pedicels slender, curved, *shorter than spikelet;* spikelet glabrous, or rarely soft-villous, ovate-oblong to elliptical, obtuse, flattened, 8-20-flowered; glumes *oblong*, *obtuse*, somewhat unequal; lower pale oblong-rhomboid, obsoletely nerved, with broad-scarious margin, obtusish, short-bifid; awn far from tip, at length spreading and somewhat twisted, longer than pale — Spring — Dry places; Lebanon; Antilebanon; Damascus; Palmyrene Desert; Amanus.

FIG. 413.

Spikelet of Bromus macrostachys

14. B. macrostachys, Desf. ⊙ .3 to .6, erect, glabrous. Panicle erect, with short, stiff branches; spikelets glabrous or glabrescent, .02 to .03 long including awns, *oblong-lenticular*, 10-16-flowered. Glumes unequal, *oblong-lanceolate*, obtusish, many-nerved; lower pale *oblong-elliptical*, bidentate, *with scarious division reaching to base of awn*, shorter than spreading, at

length twisted awn — Spring — Fields and roadsides; Syrian coast; Haurân.

Var. **lanuginosus,** Boiss. Panicle larger; spikelets large, woolly — Fields; coast to middle mountain zones and interior tablelands.

Var. **pauciflorus**, Post. Panicles narrow. Spikelets 5-10-flowered, .015 long, exclusive of awns — Beirût; Tiberias; Moab; Gilead. *B. argyphæus*, Paine.

Var. **triaristatus**, Hackel. Culms low. Panicle of 1-5 or more spikelets; lower pale of one or more of the lower flowerets 1-awned, the upper ones 3-awned, the awns purplish — Zahleh to Antilebanon, Damascus, Syrian Desert, Aleppo, and northward, and eastward.

15. B. intermedius, Guss. ⊙ ② .3 to .4; culms glabrous. Leaves linear, sheaths velvety. Panicle erect, at first somewhat loose, then contracted, cylindrical, .1 to .13 long, .02 broad, branches erect, short, the lower branched; pedicels shorter than spikelets; spikelets *linear-lenticular*, .02 long, .002 to .003 broad, 6-12-flowered; glumes lanceolate, acute, the upper broader and somewhat longer; lower pale *oblong*, obliquely acute at tip, bifid; awn *as long as pale, inserted at or below its upper third*, spreading — May and June — Waste places; coast to subalpine Lebanon; Hasbeiya; Aintâb.

16. B. mollis, L. ⊙ .3 to .6; culms velvety or glabrous. Leaves linear, acuminate, more or less hairy, especially at sheaths. Panicle erect, contracted in fruit, oblong, .05 to .1 long, .01 to .03 broad, branches erect, half-whorled, the lower often with several spikelets; spikelets soft-pubescent or glabrescent, *oblong-lanceolate*, .01 to .015 long, .002 to .003 broad, 6-10-flowered, slightly compressed; glumes lanceolate-oblong, *the lower narrower and shorter*, acute; lower pale oblong-lanceolate, prominently 7-9-nerved, apex short-bidentate, awn inserted at sinus, shorter than pale or the upper ones a little longer — Spring — Nazareth; Merj (Damascus).

17. B. brachystachys, Horn. ② .3 to .5; culms erect, slender, glabrous. Linear leaves and sheaths pubescent. Panicle oblong-ovate to oblong, .06 to .1 long, .03 to .04 broad, branches half-whorled, erect or somewhat spreading, the longest as long as spikelets; spikelets oblong to oblong-lanceolate, .015 to .02 long, .003 to .005 broad, 10-15-flowered, glabrous or hirsute; glumes nearly equal, with prominent nerves, oblong-lanceolate; lower pale oblong-rhomboid, prominently 7-nerved, apex retuse or short-bidentate, awn as long as pale or shorter — Spring — Esdraëlon; Jordan Valley; Palmyrene Desert.

FIG. 414.



Spikelet of B. brachystachys.

Var. **longipes,** Post. Glabrescent; 1 to 1.5. Panicle .3 to .4 long, .15 broad, branches .08 to .03 long, pedicels often twice as long as spikelet — In rich soil under trees; near the New Bridge over the Jordan.

18. B. patulus, M. K. ② .2 to .8; culms erect, glabrous. Linear leaves and sheaths pubescent. Panicle loose, pyramidal, branches .05 to .1 or more long, half-whorled, capillary, spreading *and at length nodding, as long as spikelet or longer;* spikelets glabrous or appressed-villous, oblong-ovate to oblong-lanceolate or oblong, .015 long, .004 to .006 broad, 8-16-flowered; glumes oblong-

elliptical, obtusish or acute, nearly equal; lower pale elliptical-oblong more or less nerved, apex short-bidentate, awn slender, as long as pale, straight or at length recurved -- May to August — Fields; middle to subalpine Lebanon; northern Syria.

19. B. pulchellus, Fig. et Not. ⊙ Low, pubescent. Panicle simple, somewhat one-sided; spikelets erect or nodding, oblong, compressed, loosely 6-9-flowered; glumes beautifully nerved, shorter than flowerets, appressed-hirtulous at back; lower pale appressed-hirtulous, bifid, obversely oblong, margin not angled, bifid into *triangular, subulate lobes*, awn inserted above middle, longer than pale, twisted -- Valleys of Sinai.

81. BRACHYPODIUM, P. de B. FALSE BROME GRASS.

Spikelets very short-pedicelled, many-flowered, cylindrical, then linear-lanceolate or oblong, laterally compressed, appressed to the axis of the spike; flowerets perfect, the uppermost tabescent; rachis generally brittle. Glumes slightly unequal, somewhat coriaceous, several-nerved, shorter than adjacent floweret. Pales nearly equal in length, the lower herbaceous or somewhat coriaceous, concave, aristate or muticous, the upper membranous, 2-keeled, truncate at tip, pectinate-hairy at keels — Perennials or annuals; spikelets appressed forming a spike-like raceme.

* *Annuals. Glumes acute.*

1. B. distachyum, L. ⊙ *Behmeh*. .15 to .4; culms geniculate-ascending, leafy to or below middle. Leaves linear, .003 broad, .05 to .06 long, hairy or puberulent. Spikelets 1-6, oblong-linear, .025 to .035 long, .004 to .006 broad, 6-16-flowered, glabrous or puberulent; axis brittle; lower pale linear-lanceolate, prominently 5-7-nerved, ciliate toward tip, ending in a straight awn shorter or longer than pale — March to August — Dry fields and waste places; common.

* * *Perennials. Glumes mucronate.*

2. B. sylvaticum, Huds. ♃ .5 to 1; root fibrous; culms numerous, erect, slender, not branching, naked above, *hirsute at nodes*. Leaves linear, .005 to .01 broad, .2 to .3 long, flaccid, with hairy sheaths. Raceme oblong-linear, .1 to .2 long, .015 to .03 broad, somewhat nodding, composed of 2-15, more or less approximated, *linear-lanceolate to linear*, 6-18-flowered spikelets, .02 to .03 long, .0015 to .002 broad; lower pale oblong, *hirtulous*, ciliate-margined toward tip, ending in an awn, in lower flowerets shorter, in upper longer than itself — June to August — Shady places; coast to middle mountain zone; interior tablelands.

Var. **pilosum,** Post. Sheaths and laminæ of leaves long-hairy — Amanus; Antilebanon plateau.

3. B. pinnatum, L. ♃ .5 to 1; root-stock long, creeping; culms erect, rigid, not branched, *minutely puberulent* at nodes. Leaves linear, .003 to .007 broad, glabrescent or puberulent. Raceme linear, .1 to .15 long, .01 to .025 broad, erect or nodding at tip, composed of 2-9, rather distant, linear, glabrous or velvety, many-flowered spikelets, .025 to .04 long, .0015 to .0025 broad; glumes oblong-lanceolate, acute, mucronate; lower pale oblong, *glabrous*, ciliate-margined toward tip, ending in an awn *shorter* than itself — June to August — Stony, dry places; coast to middle mountain zone and interior tablelands.

82. LOLIUM, L. Darnel. Tares. *Zuwân.*

Spikelets 3-many-flowered, solitary at each joint of the rachis, placed edgewise. The glumes except in the terminal spikelet 1, firm, many-nerved. Lower pale membranous, scarious at tip, awnless or awned, concave; the upper 2-toothed, 2-keeled, ciliate along the keels — Annuals or perennials. Inflorescence an interrupted, flattened spike.

* *Flowerets lanceolate.*

1. L. perenne, L. ♃ Ray Grass. *Hashîshet-el-Faras. Sammâh.* .4 to .6; root bearing clusters of sterile leaves. Leaves linear, the new ones folded lengthwise. Spikelets oblong, compressed, 3-11-flowered; glume lanceolate, *acutish, a little shorter than spikelet;* flowerets awnless — Spring — Fields and waysides; common.

2. L. multiflorum, Gaud. ⊙ or ② .4 to .6; root destitute of clusters of sterile leaves. Leaves linear, the new ones convolute — Spikelets lanceolate, 7-20-flowered; *glume rather obtuse, one-half to one-third as long as spikelet;* flowerets awnless, *or short-awned* — Spring — Littoral of Syria, and southward to the Tîh.

Fig. 415.

Spikelet of Lolium multiflorum.

Var. **pumilum**, Boiss. Culms decumbent, .04 to .09 long — Syrian coast.

Var. **aristatum**, Post. Awns two-thirds as long as lower pales — Sands; Nahr-el-Ghadîr.

3. L. rigidum, Gaud. ⊙ .2 to .5; root destitute of clusters of sterile leaves. Leaves linear, flat. Spike *stiff, often incurved. Spikelets oblanceolate,* 3-9-flowered, appressed to the rachis; glume linear-lanceolate, obtuse, *a little shorter than the spikelets;* pales muticous — Spring — Fields; common.

Var. **Rottbœllioides,** Held. Smaller; spike thicker, straight or incurved; rachis more deeply excavated; glume longer than appressed spikelet — Syrian coast; Moab; el-Ghôr.

Var. **compressum,** Boiss. et Held. ⊙ ② ♃ Culms tufted but destitute of sterile leaf clusters, decumbent; spike usually curved; spikelets close, *often imbricated, broader* than in type; Beirût; Aintâb.

* * *Flowerets elliptical, turgid in fruit. Sterile leaf-clusters* 0.

4. L. temulentum, L. ⊙ Bearded Darnel. Tares. *Zuwân.* .6 to 1. Leaves firm, flat, linear, .005 to .01 broad. Spike stiff, loose, .1 to .2 long; spikelets cuneate-oblong, 3-8-flowered, as long as internodes or longer; glume stiff, linear, obtuse, *longer than spikelet; lower pale shorter than its awn* — Spring — Fields; common.

Var. **muticum**, Boiss. Awns very short or 0 — With type.

83. AGROPYRUM, P. de B. Agropyrum.

Spikelets solitary at teeth of rachis, 5-∞-flowered, laterally compressed, with face to the rachis. Flowerets perfect, the upper one or two staminate or tabescent. Glumes 2, coriaceous, nearly equal, shorter than flowerets, lanceolate or linear, not ventricose, convex or keeled, 3-several-nerved, muticous or aristate. Lower pale similar to glumes, muticous or aristate, ∞-nerved, the nerves connivent at tip; upper pale 2-keeled, keels ciliate — Perennials or annuals.

* *Perennials. Spikelets more or less separated, on a long axis. Glumes usually ∞-nerved, convex, not keeled.*

† *Lower pale tapering into a straight awn. Roots fibrous.*

1. A. Panormitanum, Parl. ♃ 1 or more, erect. Leaves linear, flat, scabrous. Spike 2-ranked, slender, .1 to .15 long; spikelets few, .015 to .02 long, loosely imbricated, oblong linear, 3-5-flowered; glumes 7-9-nerved, *as long as flowerets*, linear-lanceolate, short-aristate; lower pale nerved only toward tip, ending in an awn flattened at base and longer than itself — Summer — Hermon, above Hasbeya; subalpine Lebanon.

† † *Lower pale muticous or very short-awned.*

‡ *Rootstock creeping.*

2. A. repens, L. ♃ 1 or more, erect. Leaves elongated, flat, scabrous at upper surface. Spike slender, .06 to .1 or more long, .005 to .01 broad, 2-ranked, flattened; spikelets near together, or the lower remote, ovate-lenticular to oblong-lenticular, about 5-flowered; glumes nearly equal, lanceolate, acuminate, sometimes mucronate; lower pale lanceolate, acuminate or obtusish, muticous or mucronate or short-aristate — May to August — Middle Lebanon.

Var. **glaucum,** Boiss. Glaucous; leaves narrower, often convolute; spike narrower, and often looser; spikelets smaller, and lower pale more obtuse — Antilebanon.

3. A. Aucheri, Boiss. ♃ .6, erect, leafy beyond middle. Leaves rigid, .004 to .007 broad, linear, hairy on both sides, sheaths tomentellous. Spike .12 to .16 long, loose, with velvety axis; spikelets .015 long, linear-oblong, 5-7-flowered, appressed to rachis, the lower scarcely longer than internode; glumes woolly, equal, two-thirds as long as spikelet, oblong-linear, velvety toward tip, somewhat keeled, obsoletely 3-nerved, obtusish — May and June—Lebanon near Fêlugha; Antilebanon.

‡ ‡ *Roots fibrous.*

4. A. elongatum, Host. ♃ .5 to .8. Leaves elongated, linear, at length convolute, filiform, erect, the upper surface with many nerves, rough. Spike .06 to .15 long, .005 to .007 broad; spikelets a little longer than internodes, appressed, oblong-lenticular to oblong, .01 to .015 long, 2-ranked, with 5-13 flowerets; axis not brittle; glumes glabrous, nearly equal, half as long as spikelet, linear-oblong, obtuse — June and July — Sands of coast; alpine summits of Lebanon (Rijâl-el-'asharah) and Antilebanon above Bludân.

* * *Annuals. Spikelets 2-ranked, imbricated on a short axis. Glumes lanceolate, keeled; lateral nerves 0, or more or less obvious.*

5. A. squarrosum, Roth. ⊙ .1 to .2, geniculate-ascending. Leaves linear, sheath of uppermost not dilated. Spike ovate-oblong, .015 to .03 long, .01 to .02 broad, dense, compressed; spikelets glabrous, 3-5-flowered, laterally compres-

Fig. 416.



Spike of Agropyrum squarrosum.

sed; glumes shorter than flowerets, oblong-lanceolate, acuminate, grooved on either side of scabrous keel; lower pale linear-lanceolate, with no lateral nerves, keel scabrous, the midrib excurrent in a mucro or more or less lengthened awn — May — Haurân to Damascus, Palmyra, Aleppo, and northward, and eastward; Sinai.

84. HETERANTHELIUM, Hochst. Heteranthelium.

Spike oblong to cylindrical, 2-ranked. Spikelets sessile, solitary at the teeth of a brittle axis, many-flowered, all the flowerets long-aristate; some spikelets with lower two flowerets or one only perfect, having two pales, the rest crowded on a stalk and reduced to a single pale; other spikelets with all the flowerets neuter, composed of a single pale. Glumes 2, subulate, rigid, somewhat remote from flowerets, shorter than they. Lower pale of fertile flowerets coriaceous, ovate, ventricose below, 5-nerved above, gradually tapering into a long awn; upper pale membranous, linear-oblong, 2-keeled, the nerves excurrent in short awns — Herbs with aspect of Hordeum.

Fig. 417.



Fertile spikelet of Heteranthelium piliferum, magnified 1½ diameter.

H. piliferum, Hochst. ⊙ .1 to .3, tufted; culms geniculate-ascending, leafy. Leaves generally hairy, linear, acuminate, flat, often longer than spike. Spike oblong, .03 to .04 long, .015 to .025 broad; spikelets 20-25, green or tinged with violet, bristly hairy throughout; sterile spikelets principally at base and tip of spike, but some intermixed with fertile spikelets in the middle, their single pale dilated at base, long-aristate; lower pale of fertile flowerets densely warty and bristly, and long-aristate — April to June — Jebel Barûk; middle and subalpine Antilebanon; Cœlesyria; Damascus; Aleppo, and northward, and eastward.

85. SECALE, L. Rye.

Spike cylindrical. Spikelets solitary at teeth of rachis, 2-flowered, sometimes with a rudiment of a third, pedicelled floweret. Glumes 2, lateral, nearly equal, linear-subulate, aristate, keeled, destitute of nerves. Lower pale somewhat coriaceous, linear-lanceolate, pectinate-ciliate, tapering into a long awn; upper pale 2-toothed, 2-keeled, serrulate-ciliate at keels — Annuals or perennials.

S. montanum, Guss. ♃ 1 or more; root fibrous; culms leafy. Leaves linear, flat, flaccid, often tomentellous. Spike linear, elongated, .05 to .1 long, .008 to .01 broad, somewhat nodding; axis brittle, its margins bearded; spikelets 2-flowered; glumes linear-subulate, half as long as flowerets; awn usually longer than lower pale — June and July — Akher Dagh.

86. TRITICUM, L. Wheat. *Hintah. Qomh.*

Spikelets solitary at teeth of the rachis, parallel to it, 2-5-flowered, laterally compressed, the upper floweret often tabescent. Glumes 2, coriaceous, ovate to oblong, ventricose, often unequal at the two sides, keeled, obliquely truncate at tip, usually 1-2-toothed, muticous or aristate, shorter than flowerets. Lower pale more or less keeled, somewhat ventricose below, entire or bidentate at tip, long-aristate or muticous,

nerves not connivent at tip; upper pale membranous, 2-keeled, stiff-ciliate at keels — Annuals.

T. monococcum, L. ⊙ 1 to 1.5. Leaves linear. Spike linear, .05 to .07 long not including awns, .005 to .006 broad, 2-ranked, dense; rachis brittle, glabrous or glabrescent; spikelets oblong, about 3-2-flowered, with a lower floweret perfect and aristate, sometimes a second sterile and aristate, the uppermost muticous; glumes ovate-oblong, acutely 2-keeled, scabrous at keels, with 2, triangular, somewhat unequal teeth at tip; lower pale of lowermost floweret keeled, short bidentate below tip, awn prolonged from midrib, often .1 long — June — Sôf Dagh (northern Syria), and northward.

T. vulgare, L., the cultivated Wheat, varies with muticous or more or less awned forms. The spikes are simple or compound, the latter being more cultivated in Egypt, rarely in our district. Many believe that cultivated wheat is derived from some species of Ægilops.

87. ÆGILOPS, L. ÆGILOPS.

Spikelets sessile at each joint of the rachis, 3-several-flowered, parallel to the rachis, the terminal spikelet, or the upper 2-3 sterile, more slender than the others. Glumes 2, coriaceous or cartilaginous, convex, not keeled, many-nerved at back, truncate at apex, entire or toothed, teeth sometimes long-awned. Lower pale papyraceous, convex, not keeled, many-nerved, nerves not connivent at tip, 1-3-toothed, teeth muticous or awned; upper pale with 2, ciliated keels — Annuals.

* *All the glumes awned.*

1. Æ. ovata, L. ⊙ *Sha'ir Iblîs.* .2 to .4. Spike *ovate, dense,* .02 to .04 long; spikelets 3-5, *the lowermost* generally rudimentary; others 3-4-flowered, ovate, narrowed at top, the upper 1 or 2 sterile, 2-flowered; glumes inflated, mostly 4- sometimes 5-awned; lower pales nearly as long as glumes, 2-3-awned, the awns of both glumes and pales *nearly equal* — Spring — Grassy places; common.

Var. **triaristata,** Coss. et Dur. Two or three of the lower spikelets rudimentary; glumes 2-3-awned; lower pales 1-2-awned — Grassy places; shading off to type.

Var. **Lorentii,** Boiss. Glumes or some of them 2-awned, one awn broader than the rest, 4-6-nerved — Syrian coast; rare; shading off into the last.

Var. **quinquearistata,** Post. Glumes 5-aristate — Aintâb; Marash; Akher Dagh.

2. Æ. triuncialis, L. ⊙ .2 to .4. Spike *linear, slender,* .05 to .06 long; spikelets 5-7, each 2-3 flowered, oblong, the upper sterile, and *the lower two or three* rudimentary; glumes not inflated, 3-awned, or those of the lower spikelets 2-awned, *awns of upper spikelets twice as long* as those of the lower; lower pales of the lower spikelets 3-*toothed or short-awned;* those of the *terminal spikelet long-awned* — Spring — Grassy places; common.

Var. **brachyathera,** Boiss. Awns short, the terminal about twice to four times as long as glume — Coast; Gilead.

* * *Lower glumes muticous or short-awned; glumes of terminal spikelet very long. Lower pales of upper spikelets, rarely of all, long-awned.*

3. Æ. caudata, L. ⊙ .3 to .5. Spike .06 to .08 long, .005

broad; spikelets 4-7, about as long as internodes of scarcely brittle axis, 4-2-flowered; glumes of lateral spikelets oblong, 2-3-toothed at tip, teeth triangular-lanceolate, muticous; lower pale unequally 2-3-toothed, muticous; glumes of terminal spikelet, *ending in one or two, lanceolate-subulate awns; lower pale mucronate or short-aristate* — April and May —

Var. **polyathera,** Boiss. One or more of the teeth of the glume of the lateral spikelets more or less prolonged into an awn — Ascent from Tell-er-Râmeh to Nebo (Moab).

4. Æ. comosa, Sibth. et Sm. ⊙ .2 to .3. Spike slender, .02 to .03 long; spikelets 3-4, as long as internodes or longer, 2-3-flowered; glumes of lateral spikelets broad, 2-3-toothed at tip, teeth triangular-lanceolate, muticous; lower pale short-bidentate, muticous; awns of glumes of upper spikelets 1-3, the lateral *twice to thrice as long as pale, the intermediate much longer; lower pale of terminal spikelet toothed or aristate* —May—El-Masna'ah (Antilebanon).

Var. **subventricosa,** Boiss. Spikelets 2-3, somewhat ventricose. The glumes of the lower ones with more or less elongated teeth or awns — Palmyra.

Var. **brachyathera,** Post. Awns of glumes of terminal spikelet twice to three times as long as pales; awns of pales very short — El-Ghôr.

Probably further study will show that species 3 and 4 are one.

* * * *All the glumes muticous. Lower pale of upper spikelets, rarely of all, long-awned.*



FIG. 418. Spike of Ægilops comosa.

FIG. 419. Spike of Ægilops squarrosa.

5. Æ. squarrosa, L. ⊙ .3 to .4. Spike *cylindrical*, .06 to .15 long, .005 broad; spikelets 7-11, 3-5-flowered, about as long as the grooves of the very brittle axis in which they rest, the lower two-flowerets fertile; glumes oblong-quadrate, *scabrous*, abruptly truncate at tip, sometimes 3-4-crenulate-apiculate, three-fourths as long as lower pale; lower pale truncate or retuse at tip, *in the uppermost spikelets with a single, long awn, in the lower with an awn a little longer than pale or* 0, muticous — May — El-Masna'ah (Antilebanon).

6. Æ. crassa, Boiss. ⊙ .3 to .5. Spike cylindrical, *moniliform*, .06 to .1 long, .007 broad; spikelets 7-9, immersed in the deep excavations of the zigzag, brittle axis, ventricose, 3-4-flowered, a little longer than internode; glumes coriaceous, *tomentellous*, oblong-ovate, *rounded or truncate at tip and obsoletely or manifestly* 1-3-*denticulate;* lower pale longer than glumes, oblong at base, *tapering into a* 3-5-*nerved, needle-like awn, in the lower spikelets half as long as pale, and in the upper longer than pale* — Spring —

Var. **macrathera,** Boiss. Awns of upper 3-4 spikelets, *many times as long as spikelets* — Dîmâs (near Damascus).

7. Æ. bicornis, Forsk ⊙ .3 to .6. Spike not including awns .06 to .1 long, .008 broad, 2-ranked; spikelets somewhat longer than internodes, about 3-flowered, the upper floweret tabescent, not awned; glumes coriaceous, obliquely oblong, convex, truncate or retuse at tip, 1-2-denticulate, scabrous at nerves, somewhat shorter than pales; lower pales oblong, *all produced into a scabrous awn, twice to ten times as long as pale, the lateral nerves at base of awn sometimes produced into a short mucro* — April and May — Sands and waste fields; coast.

Var. **mutica,** Post. Lower pales of lower or of all the spikelets muticous — Haifa.

8. Æ. Aucheri, Boiss. ⊙ .3 to .5. Spike *loose, zigzag*, 2-ranked, .08 to .1 long; spikelets 5-11, 3-5-flowered, as long as joints of axis in which they fit; glumes of all the spikelets oblong, unequal, convex, obsoletely keeled, truncate and mucronulate at tip; lower pale longer than glumes, oblong, truncate at tip, in lateral spikelets 1-2-*denticulate at tip, the lateral teeth rounded, the middle acute;* lower pale of terminal spike tapering into an awn *many times its length* — April to June — Fields; coast; interior tablelands; ascent from el-Ghôr to Nebo (Moab).

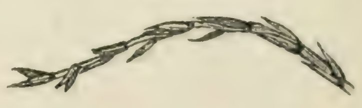
Var. **polyathera,** Boiss. Lower pales of lateral spikelets produced into an awn half to twice as long as they — Coast; Aintâb.

88. LEPTURUS, R. Br. Lepturus. Sea Hard-Grass.

Spikelets solitary, immersed in the hollows of the rachis, 1-flowered, with occasionally a rudiment of another floweret, or 2-flowered. Glumes of all the spikelets 2, coriaceous, many-nerved, in the lateral spikelets placed edge to edge in front of spikelet, open before flowering, then closed, in the terminal spikelet opposite. Flowerets membranous, oblique to the axis, the pales of equal length, the lower concave, muticous, the upper 2-keeled — Annuals, with filiform spikes.

L. incurvatus, L. ⊙ *Shu'air. Timzein. Haidah.* .1 to .4; culms clustered, decumbent or ascending, incurved, often branching at base. Leaves linear, flat, the uppermost near the base of the spike. Spike .05 to .2 or more long, .001 to .0015 thick; spikelets usually longer than internodes; glumes coriaceous, equal, 3-5-nerved, *longer than* floweret; pales lanceolate acuminate; anthers *minute, ovate-oblong* — February to May — Sandy places and fields; coast; Sinai.

Fig. 420.



Tip of spike of Lepturus incurvatus.

89. PSILURUS, Trin. Psilurus.

Spikelets solitary (rarely twin), immersed in hollows of axis, 2-flowered, one floweret sessile, perfect, the other pedicelled, usually abortive. Glume 1, triangular, situated at the outer side of the spikelet, much shorter than pale. Pales parallel with the axis, the lower 1 nerved, linear-lanceolate, subulate-aristate, enclosing the 2-keeled, ciliolate upper pale. Stamen 1 — Annual herbs, with filiform spikes.

P. nardioides, Trin. ⊙ .1 to .3; culms filiform. Leaves fili-

form. Spikelets subulate (not including awns), shorter than internodes; *glume minute, tooth-like;* awn as long as lower pale, straight — April to June — Dry hills; coast to middle and subalpine mountain zones.

90. MONERMA, Pal. MONERMA.

Spikelets solitary, immersed in excavations of the axis, 1-flowered, with sometimes a rudiment of a second. Glumes coriaceous, those of the terminal spikelets 2, opposite, of the lateral spikelets 1, covering the floweret. Floweret membranous, parallel with the axis; lower pale acute, upper 2-keeled, 2-toothed — Annuals.

M. cylindrica, Willd. ⊙ .05 to .2; culms clustered, ascending or erect, often branched, thickish. Leaves linear, flat, at length involute. Spike .05 to .1 long, .0015 thick, *straight or sometimes slightly incurved;* spikelets somewhat longer than internode; glumes lanceolate, acute, pungent; at first spreading, then closely appressed to axis; pales hyaline, the lower lanceolate, acute — May — Sandy places and waste fields; coast.

91. HORDEUM, L. BARLEY. *Sha'ir.*

Spikelets 3 in each excavation of the rachis, each 1-flowered, the lateral stipitate, staminate or neuter, the intermediate perfect. Glumes awn-like, 3 pairs, side by side toward the outer aspect of the spikelets, forming a sort of involucre. Pales herbaceous, opposite the rachis; the lower (outer) pale of the fertile floweret long-awned from its apex. Upper pale membranous, 2-keeled, scabrous or ciliolate at keels — Annuals or perennials with spiked inflorescence.

* *Annuals.*

1. H. Ithaburense, Boiss. ⊙ .5 to 1, erect. Leaves flaccid, linear, acuminate. Spike (with awns) .2 to .3 long, .008 to .01 broad, flattened, 2-*ranked*, with brittle axis; lateral spikelets stipitate, staminate, muticous; perfect spikelet in the middle, sessile, aristate; glumes lanceolate-subulate at base, *ciliate-plumose*, the longer awns once and a half as long as sterile flowerets, lower pale of lateral spikelets muticous; awn of fertile pale scabrous, .15 to .3 long — April and May — Et-Tîh; Judæan Desert; Mt. Tabor; Gilead to Damascus, Palmyra, and eastward. This species may be the original of the cultivated species *H. distichum*, L. and *H. vulgare*, L. (the 4-ranked Barley).

2. H. murinum, L. ⊙ .1 to .4, ascending. Spike cylindrical, .05 to .1 long, .02 to .035 broad, dense, with brittle rachis; the fertile and sterile spikelets nearly of equal breadth; glumes *lanceolate and ciliate at base*, tapering into awns, half to twice as long as lower pale; awn of lower pale of all spikelets *twice as long as glumes* — Spring — Roadsides and waste places; everywhere to subalpine regions.

3. H. maritimum, With. ⊙ .1 to .4, usually tufted, geniculate-ascending. Spike terete, .02 to .04 long, .01 broad, rachis scarcely brittle; the sterile spikelets smaller than the fertile, *sometimes* 0; glumes *scabrous, awl-shaped from base*, 2-3 times as long as floweret; awn of lower pale of fertile floweret somewhat longer than glumes — Spring — Coast to middle zones and tablelands, especially in salty places.

* * *Perennials.*

4. H. bulbosum, L. ♃ *Qurrâm. Qurreim.* 1 or more; *corm*

at base of culm enveloped by a fibrous covering. Spike somewhat nodding, .1 to .15 long, .01 to .03 broad, flattened, rachis not brittle; sterile spikelets as long as or somewhat longer than fertile; glumes of lateral flowerets setaceous from base, longer than pale; glumes of fertile floweret lanceolate, ciliate at base, setaceous above, longer than pale; lower pale of fertile floweret with an awn 3-4 times its length — Spring and summer — Grassy places; common throughout.

Var. **brevispicatum,** Post. Spike .02 to .04 long — Flanks of Hermon.

92. ELYMUS, L. Lyme Grass.

Spikelets 2-4 at teeth of rachis, all sessile and fertile, 2-∞-flowered, or 1-flowered with a rudiment of a second. Glumes 2 to each spikelet, antero-lateral, forming an involucre at the base of the pair or cluster of spikelets. Pales opposite the rachis, the lower concave, entire, muticous or aristate; upper pale membranous, 2-keeled, scabrous at keels, truncate or 2-toothed at tip — (Ours) Annual herbs.

E. Caput Medusæ, L. ⊙ Medusa's Head .3 to .4, erect. Spike somewhat nodding, (including awns) .06 to .15 long, .03 to .05 broad; axis *not brittle, glabrous;* lowermost spikelets single, the rest twin. 1-flowered with a rudiment of a second; glumes subulate, rigid, twice as long as pale, ascending or spreading; lower pale linear, 3-nerved, scabrous, with an awn .02 to .1 long; *upper pale truncate* — May to June — Rocky, sandy places; Antilebanon to Damascus, Palmyra, Aleppo, Aintâb, and northward.

Fig. 421.

Spike of Elymus Delileanus.

2. E. Delileanus, Schult. ⊙ .1 to .3, geniculate-ascending. Spike stiff, oblong, .02 to .05 long, .015 to .03 broad; axis *brittle, bearded with white bristles;* spikelets twin, 2-ranked, 2-flowered, the neutral floweret long-pedicelled; glumes coriaceous, lanceolate-subulate, scabrous, tapering into an awn, equal to that of lower pale; lower pale oblong-lanceolate, concave, 5-nerved, scabrous, tapering into a flattish awn .02 long — April and May — Waste fields; coast to middle mountain zone and interior tablelands; Palmyrene Desert.

SERIES II.

CRYPTOGAMIA or FLOWERLESS PLANTS.

Vegetables, destitute of proper flowers, producing, in place of seeds, minute bodies of homogeneous structure (*spores*) in which there is no embryo before germination.

Class III. **ACROGENS.**

Cryptogams with a distinct axis (stem and branches) growing from apex only, containing woody fibre and vessels (especially ducts) and usually with some kind of foliage.

Order CXXII. **EQUISETACEÆ**, D. C. (Horse-Tail Family).

Leafless plants, with rush-like, hollow, jointed stems from running root-stocks and terminated by a cone or spike, which is composed of shield-shaped, stalked-scales, bearing the spore cases beneath.

EQUISETUM, L. Horse-Tail. Scouring Rush. *Qot'-wasl.*

Sporangia 4-7, arranged in a circle under the angled scales of the spike, 1-celled. To the base of each spore are attached 4, thread-like and club-shaped, elastic filaments, which roll up closely around the spore when moist, and uncoil when dry. Stems striate-grooved (cuticle abounding in silex), hollow, with an outer circle of air cavities corresponding with the grooves. Joints solid, bearing a sheath split into teeth, corresponding in number and position with the principal ridges of the stem. Branches whorled.

* *Fertile stems leafless, marcescent after fruit-bearing; sterile later, leafy.*

1. E. Telmateia, Ehr. ♃ Fertile stems .2 to .3; sheaths tubular-turbinate, .02 to .03 long, fringed into 30, subulate teeth; spike .05 long, .01 thick. Sterile stems .6 to 1, about 20-ridged, teeth of sheaths of simple, octangular, slender branches 4 — March and April — Coast to middle mountain zone.

* * *Fruiting and sterile stems alike, lasting through the winter.*

Fig. 422.



Tip of branch of Equisetum ramosum.

2. E. ramosum, Schl. ♃ .3 to 1, pale green or glaucous; stems erect, simple or whorled-branched, 8-15-ridged; sheaths of branches 6-8-toothed, teeth triangular, often black-tipped, and with a scarious-setaceous

appendage. Spikes solitary, terminal or racemed at tip of upper branches, tapering-mucronate — May to September — Moist places and sands; common.

ORDER CXXIII. **FILICES.** L. (FERN FAMILY).

Leafy plants, fronds usually stalked, growing from a prostrate or ascending root-stock, erect or circinnate in bud, and bearing on their under surface 1-celled spore-cases, free or in groups (sori); the sori naked or covered by a membrane (*indusium*). *All perennials except Gymnogramme leptophylla.*—Sporangia opening in various ways, and discharging numerous, minute spores. Antheridia and pistillidia formed, and fertilization effected, on the seedling plantlet.

TRIBE I. **OPHIOGLOSSEÆ.** Sporangia 1-celled, sessile, spiked, naked, destitute of a ring, opening by a transverse slit into two valves. Fronds straight in bud, divided into two, petioled segments, the anterior fertile, the posterior sterile.

1. OPHIOGLOSSUM. Sterile frond entire, with anastomosing veins.

TRIBE II. **OSMUNDACEÆ.** Sporangia 1-celled, pedicelled, naked, destitute of a ring, reticulated, opening by a longitudinal slit into two valves. Fronds circinnate in bud.

2. OSMUNDA. Fertile pinnæ contracted. Sporangia on their margins.

TRIBE III. **POLYPODIACEÆ.** Sporangia 1-celled, collected in dots, lines or clusters (*sori*) on the back or margins of the frond, stalked, reticulated, surrounded by an incomplete, jointed ring, which straightens at maturity and ruptures the spore-case. Fronds circinnate in bud.

* *Sori naked.*

3. GYMNOGRAMME. Sori on secondary nerves, at length covering back of pinnæ.
4. CETARACH. Sori oblique, mixed with scurfy scales, one-sided.
5. POLYPODIUM. Sori round, scattered, or in one or more rows on each side of midrib.

* * *Sori more or less covered by reflexed margin of pinnæ.*

6. NOTOCHLÆNA. Fronds bipinnatipartite, villous or chaffy at lower, sometimes at upper surface.
7. CHEILANTHES. Fronds tripinnatipartite, glabrous at upper, pubescent at lower surface.

* * * *Sori (at least when young) covered by an indusium.*

8. PTERIS. Sorus occupying the whole margin of frond, covered by an indusium arising from or near margin.
9. BLECHNUM. Sori linear, along both sides of midrib; indusium attached externally.
10. SCOLOPENDRIUM. Sori parallel, nearly at right angles to midrib. Indusium double.
11. ADIANTUM. Sori under a reflexed portion of the margin of the fronds.
12. ASPLENIUM. Sori oblong, oblique, one-sided, opening inward.
13. ASPIDIUM. Sori orbicular, indusium peltate, fixed by umbilicate centre.
14. NEPHRODIUM. Sori orbicular, indusium orbicular-reniform with umbilicate centre.
15. CYSTOPTERIS. Sori roundish. Indusium half cup-shaped opening at (distal) outer side.

FIG. 423.



(a) Spike of Ophioglossum vulgatum. (b) Row of sporangia. 6 diameters.

1. **OPHIOGLOSSUM,** L. ADDER'S TONGUE.

Spike of fertile frond simple, linear, 2-ranked.

O. vulgatum, L. ♃ .1 to .2; sterile frond ovate, or ovate-lanceolate, abruptly tapering at base, and somewhat decurrent. Cells of epidermis wavy — Early spring—Shady, damp places; Zebedâni (Antilebanon).

2. **OSMUNDA,** L. FLOWERING FERN.

Fronds bipinnate; sterile pinnæ leafy, fertile, contracted. Sporangia globular.

O. regalis, L. ♃ Royal Fern. .3 to .6. Stipe grooved; lower pinnæ sterile, pinnules oblong, obliquely truncate at base, crenulate; upper pinnæ fertile, forming a panicle of linear pinnules, densely covered with fruit dots — May — Moist shady places; middle Lebanon.

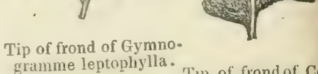
3. GYMNOGRAMME, Desv. GYMNOGRAMME.

Sporangia in more or less evident sori, at length confluent. Frond destitute of scales beneath, 1-3-pinnate — Dwarf annuals, with light green foliage, growing on the northern exposure of walls and rocks.

G. leptophylla, L. ⊙ .05 to .2, glabrous. Stipe at first green, then purplish. Lower fronds short, with fan-shaped segments, upper longer, with obovate-cuneate segments — February to April — Coast region.

FIG. 424. FIG. 425.





Tip of frond of Gymnogramme leptophylla.

Tip of frond of Ceterach officinarum.

4. CETARACH. Willd. CETARACH.

Sori linear, mixed with scurfy scales, on secondary veins of lower surface of pinnatipartite frond — Dwarf, tufted ferns, growing in clefts of rocks, and chinks of walls.

C. officinarum, Willd. ♃ Fronds oblong, spreading; pinnæ alternate, round-ovate to oblong, obtuse, entire, glabrous above, confluent — February to May — Common throughout.

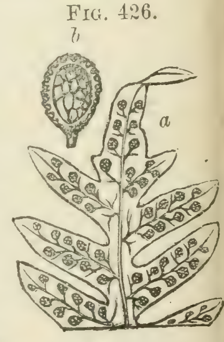
Var. **sinuatum**, Post. Pinnæ not overlapping, sinuate, crenate-toothed and lobed — Abeih (Lebanon).

5. POLYPODIUM, L. POLYPODY.

Sori round, naked, arranged on the back of the frond in one or more rows on each side of the midrib, or scattered. Stipes jointed on root-stock.

P. vulgare, L. ♃ Root-stock creeping, often above ground, densely covered with rusty scales. Fronds evergreen, .15 to .3 high, petioled, glabrous on both sides, deeply pinnatifid; pinnæ oblong and oblong-linear, acute or obtuse, entire or serrulate — February to July — Shady rocks; common.

FIG. 426.



(*a*) Tip of frond of Polypodium vulgare. (*b*) A sporangium. 30 diameters.

6. NOTOCHLÆNA, R. Br. NOTOCHLÆNA.

Sori marginal, oblong-orbicular, with numerous sporangia, soon confluent, concealed by the long wool or chaff. Stipe continuous with root-stock.

1. N. lanuginosa, Desf. ♃ Fronds tufted, .1 to .2 long, *with very short stipes, oblong*, bipinnate, green, hairy at upper surface, *covered with tangled wool at lower;* pinnules small, round or ovate, entire, or lowermost pinnatipartite—April—Sea of Galilea; Nazareth; Fezûr near 'Abeih, and northward.

2. N. Marantæ, L. ♃ Creeping root-stock densely covered with rusty chaff. Fronds .15 to .4 high, *long stiped*, oblong-lanceolate, green, glabrous at upper surface, *densely clothed at lower with silvery-rufescent scales*, bipinnate, pinnules oblong, obtuse, entire—May and June—Clefts of rocks; Cassius, Amanus, and northward.

FIG. 427.



Tip of frond of Notochlæna Marantæ.

FIG. 428.



(*a*) Tip of frond of Cheilanthes fragrans. (*b*) A pinnule, with reflexed indusia, and woolly indument.

7. CHEILANTHES, Sw. LIP FERN.

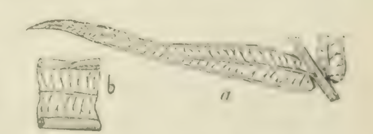
Sori marginal, with few sporangia, distinct or at length confluent, more or less covered by the reflexed margin of the pinnules, which is fringed with white wool — Low, tufted perennials, with 3-pinnate, dark-green leaves.

Ch. fragrans, L. ♃ Neck clothed with rusty scales. Fronds glabrous, .1 to .15 high, with brown, shining stipes, oblong-lanceolate; ultimate segments round-ovate, lowermost few-lobed or parted — April to July — Clefts of rocks; common. Plant delightfully fragrant in drying.

8. PTERIS, L. BRAKE.

Sorus linear, occupying a receptacle along the whole margin of fertile frond, and more or less covered by an indusium arising from or near the edge. Stipe continuous with root-stock. Fertile and sterile fronds distinct, or lower segments sterile, and upper fertile.

FIG. 429.



(*a*) Undeveloped pinna of Pteris longifolia. (*b*) Segment of a developed pinna, with a part of the margin on upper side rolled back, showing the sporangia.

1. P. longifolia, L. ♃ Root-stock *clothed with rusty scales at apex*. Fronds .3 to 1 high, *lanceolate*, coriaceous, *pinnatisect* into many pairs of opposite, linear-lanceolate segments, those of the sterile fronds, and the inferior ones of the fertile broader, cartilaginous-toothed — March to August — Banks of streams; common.

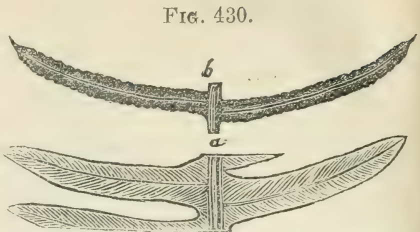
2. P. aquilina, L. ♃ Bracken. *Dishir.* Root-stock black, *naked at apex.* Frond dull-green, .7 to 1 high and broad, *ternate* at the apex of a stout stalk .3 or more high, the branches 2-pinnatisect; pinnules oblong-lanceolate, the upper undivided, the lower more or less pinnatifid — Summer — Woods and mountain sides to alpine regions.

9. BLECHNUM, L. BLECHNUM.

Sori linear, continuous on either side of midrib of pinna, parallel to it and occupying the whole space between it and the marginal anasto-

moses of nerves. Indusium arising from near margin of pinna, inner border free. Fronds pinnate; stipe continuous with root-stock.

Fig. 430.



(a) Pinnæ of sterile frond of Blechnum Spicant. (b) Pinnæ of fertile frond, after the marginal indusium has been rolled back.

B. Spicant, L. ♃ Fronds tufted, .5 to .6 high, pinnate, of two kinds; sterile with short stipes, *elongated, lanceolate*, tapering toward base and apex, pinnæ entire, oblong-lanceolate, *often confluent at base;* fertile few, *with long stipes, longer than sterile*, pinnæ linear, *distant* — June to August — Middle zone of Lebanon, and northward.

10. SCOLOPENDRIUM, Sm. Hart's-Tongue.

Sori linear, parallel, nearly at right angles to the midrib, in pairs, one on the upper side of one veinlet, the other on the lower side of the next above, each with its linear indusium, the two meeting at first in the middle, their margins separating at maturity, and disclosing the sporangia. Fronds glabrous. Stipe continuous with root-stock, somewhat chaffy.

Fig. 431.



Tip of frond of Scolopendrium vulgare.

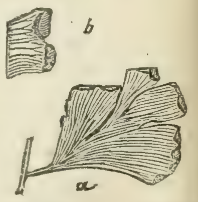
1. S. vulgare, Sm. ♃ Fronds *lanceolate-lingulate*, .2 to .5 long, from a cordate base, acute or obtuse, *undivided*, entire or wavy-margined — April to July — Moist, shady rocks; common to alpine regions.

2. S. Hemionitis, Sm. ♃ Fronds *cordate-ovate*, at length oblong-lanceolate, .1 to .25 long, often *divaricate*, or *hastate*, 2-4-*lobed*, entire or wavy-margined — April to July — Shady, moist rocks; middle and alpine zones of Lebanon; Galilee.

11. ADIANTUM, L. Maiden's-Hair.

Sori oblong, placed transversely on the summit of a lobe or tooth of the frond, attached to an uninterrupted, vein-like receptacle, which connects the tips of the forked and free veins, and covered by a crescentic indusium, continuous with the margin, and opening inwardly.

Fig. 432.



(a) Pinna of Adiantum Capillus Veneris. (b) Segment (2 diameters) showing an open and a closed indusium.

A. Capillus Veneris, L. ♃ .1 to .5; root-stock creeping. Fronds clustered on long stipes, at first green, hairy, then black, glabrous, polished, tripinnate, pinnæ and pinnules alternate, leaflets obliquely cuneate-obovate, destitute of main rib, with entire lateral margin and crenate or truncate-lobed tip — March to December — Caves, and dripping rocks and walls; everywhere.

12. ASPLENIUM, L. Spleenwort.

Sori oblong or linear, oblique. Indusium one-sided, fixed by one edge to the inner side of the fertile vein, opening inward (upward). Stipe continuous with the root-stock — Tufted ferns, usually growing in shady places.

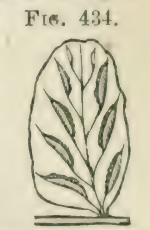
Fig. 433.



Tip of frond of Asplenium Bourgæi.

1. A. Bourgæi, Boiss. ♃ .05 to .15. Fronds oblong-lanceolate, pinnate; the short stipe and rachis *greenish-brown*, glabrous with exception of scattered, membranous, veined chaff; pinnæ oblong, obtuse, sessile, somewhat decurrent, pinnatifid, with minute, oblong, denticulate lobes — Clefts of rocks — Natural bridge of Litâny; Amanus, and northward.

Fig. 434.



Pinna of Asplenium Trichomanes 4 diameters.

2. A. Trichomanes, L. ♃ .1 to .4, densely tufted. Fronds linear-lanceolate, short, stipe and rachis, *dark*, *polished brown*, the latter with a crenulate, winged margin; pinnæ nearly or quite sessile, obliquely cuneate or truncate at base, roundish-oblong or elliptical, unequal-sided, crenulate — Summer — Clefts of rocks and walls; common.

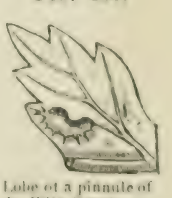
3. A. Rutamuraria, L. ♃ .05 to .15. Fronds ovate, glabrous or glandular, 2-3-alternate-pinnate; long stipes and rachis *green*, blackish at base; the few ultimate pinnules obovate, with wedge-shaped base, and crenulate or denticulate apex — Summer and autumn — Alpine summits of Ṣunnîn and Makmel.

4. A. Adiantum-nigrum, L. ♃ Silver Fern. .2 to .4. Stipes long, black, glossy, stout. Fronds glabrous, coriaceous, triangular-lanceolate, acuminate, 2-3-pinnate; lobes of ultimate pinnules oblong, cuneate at base, entire or dentate at apex — April to July — Shady rocks; common in lower and middle mountain zones.

Var. **Virgilii**, Boiss. More dissected than in type.

5. A. septentrionale, L. ♃ .1 to .2, tufted; root-stock short, covered with tawny scales. Fronds on long, glabrous stipes, coriaceous, glabrous, forked into 2-5, linear, elongated, petiolulate, acute, entire or sparingly incised-toothed lobes; sori linear, at length confluent, covering the whole lower surface of the lobe; margin of indusium entire — July — Clefts of rocks; Amanus, and northward.

Fig. 435.



Lobe of a pinnule of A. Filix Fœmina, 8 diameters.

6. A. Filix-Fœmina, L. Lady Fern. ♃ .6 to 1; root-stock thick. Stipe more or less covered at base with dark-brown, scarious scales; frond oblong, lanceolate, tapering at base and apex, bipinnatisect; pinnæ oblong, tapering; pinnules numerous, oblong-lanceolate, lobes ovate, usually 3-4 toothed on each side toward tip; sori oval or reniform; indusium fringed — July — Woods; Amanus.

13. ASPIDIUM, Sw. Shield Fern.

Sori orbicular, in rows or scattered. Indusium orbicular, peltate, fixed by umbilicate centre, free all around margin. Stipe continuous with root-stock.

A. aculeatum, L. ♃ .6 to .1; root-stock thick, densely clothed with brown, scarious, ovate, tapering scales. Stipe short; axes clothed with tawny, scarious scales; frond oblong-lanceolate, tapering at both ends, bipinnatisect; pinnæ oblong-lanceolate, tapering; pinnules trapezoidal, unequally spiny-dentate, mucronate at tip, the lowest somewhat pedicelled, the upper confluent; sori in two rows, parallel to midrib—July—Woods; Amanus, and northward.

FIG. 436.

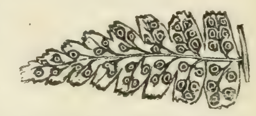


Lower pinnules of Aspidium aculeatum.

14. NEPHRODIUM, Rich. NEPHRODIUM.

Sori orbicular, in rows or scattered. Indusium before maturity hemispherical-reniform, with an umbilicate centre. Stipe continuous with root-stock.

FIG. 437.



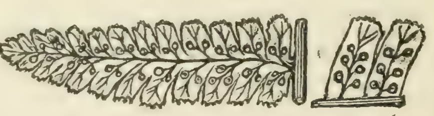
Pinnule of Nephrodium rigidum

1. N. rigidum, Sw. ♃ .8 to 1.2; root-stock thick. Stipe and rachis green, clothed with buff-colored, scarious scales; frond oblong-lanceolate, tapering but little at base, alternately bipinnate; pinnæ oblong-lanceolate, acuminate; pinnules oblong-lanceolate, at base of pinna pinnatisect into rounded toothed lobes, toward apex undivided, denticulate. Sori in 2 rows near margin; indusium glandular — March to September —

Var. **australe**, Boiss. Lower pinnules more pinnatisect. Indusium often glabrous — Shady places.

2. N. Filix-Mas, L. ♃ Male Fern. *Es-sarkhas-edh-dhakar*. .3 to 1; root-stock thick, oblique, densely clothed with tawny scales. Stipe more or less chaffy; frond oblong-lanceolate, tapering at both ends, bipinnatisect; pinnæ oblong to oblong-lanceolate, tapering; pinnules oblong, truncate, confluent at base, crenate-toothed at apex; sori on lower pinnules in two rows, on upper few, scattered — July —

FIG. 438.

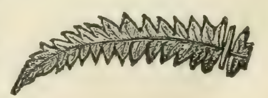


(*a*) An upper pinna of Nephrodium Filix-Mas. Var. obtusum. (*b*) Two pinnules of a lower pinna.

Var. **obtusum**, Post. Fronds oblong, slightly tapering. Pinnæ oblong, obtuse — Woods; Amanus.

3. N. Thelypteris, L. ♃ .3 to .8 or more; root-stock *slender, creeping*. Stipe *long, slender, naked, polished*; frond oblong, acutish at both ends, bipinnatisect; pinnæ oblong-lanceolate to linear-lanceolate, axis naked; pinnules confluent at base, in sterile fronds oblong, acute, entire, in fertile fronds triangular, owing to rolling in of margins; sori in two rows, at length confluent — May and June — Antilebanon, one hour east of Kefr Hûneh.

FIG. 439.

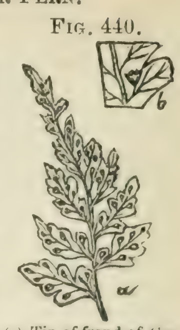


Upper pinna of Nephrodium Thelypteris.

15. CYSTOPTERIS, Bernh. Bladder Fern.

Sori roundish, borne on the back of a straight fork of the free veins. Indusium cup-shaped, attached by its base on the inner side (toward the midrib), early opening at its free, external, jagged-lobed margin, and soon withering and disappearing — Tufted ferns, with 2-3-pinnate fronds, the lobes cut. Stipe continuous with root-stock.

Fig. 440.



(*a*) Tip of frond of Cystopteris fragilis, showing mature fruit dots. (*b*) An immature fruit dot, showing indusium. 3 diameters.

C. fragilis, L. ♃ .1 to .3; root-stock horizontal. Fronds with long, yellow, polished stipes, oblong-lanceolate, 2-3 pinnate; pinnæ and pinnules ovate-oblong, the latter irregularly pinnatifid and cut-toothed, *decurrent on the marginal or winged rachis* — Summer —

Var. **tenuisecta.** Boiss. Lobes of pinnules narrower, and whole plant more delicate — Alpine and subalpine Lebanon, Amanus, and northward.

Order CXXIV. LYCOPODIACEÆ, D. C. (Ground-Pine Family).

Stems alternately or dichotomously branched, leafy, often decumbent at base. Leaves persistent, (in ours) in 4 rows or spirally arranged. Sporangia (in ours) in the axils of all the leaves of fertile branches — Low, green plants.

SELAGINELLA, Spring. Selaginella.

Sporangia of two kinds on the same spike, the lower obovate-spherical, with 3-4 cells, containing 3-4, large, 3-striate spores, the upper with single, muriculate cells, containing numerous, minute spores — Low plants, appressed to rocks with northern exposure, with (in ours) 4 rows of minute leaves.

S. denticulata, L. ♃ Leaves ovate, cuspidate, those of sterile flattened branches on the upper and lower and lateral aspects of branch, serrulate, the lateral .0015 long, .001 broad, the upper and lower smaller, more appressed. Bracts of cylindrical, solitary or twin, .01 long spikes, smaller than sterile leaves, 4-ranked around stem, longer, cuspidate — Summer — Rocks; along coast.

Fig. 441.

Tip of sterile branch of S. denticulata. (*a*) Rootlet.

INDEX.

The names of the Classes, Subclasses, and the Latin names of Orders, are in full capitals; of the Genera, and English names, in common type.

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